
SERVICE MANUAL

COLOR MONITOR **MultiSync® FE700/FE700M**

**MODELS FE700(N9705) (A)/(B)
FE700M(N9705) (A)/(B)**

FE700 have two kind models.

The maintenance of FE700(models JC-17W01) on the nameplate is performed by the original service manual(Part No.599910496)

The maintenance of FE700(models N9705) on the nameplate is performed by this service manual.

FE700M has the AUDIO unit instead of the revolving stand.

NEC-MITSUBISHI electric visual systems Corporation

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08109420
08109421
08109422
08109423



WARNING

The SERVICE PERSONNEL should have the appropriate technical training, knowledge and experience necessary to:

- Be familiar with specialized test equipment, and
- Be careful to follow all safety procedures associated with high voltage CRT circuit designs to minimize danger to themselves and their coworkers.

To avoid electrical shocks, this equipment should be used with an appropriate power code and be connected only to a properly grounded AC outlet.

This equipment utilized a micro-gap power switch. Turn off the set by first pushing the front panel power switch. Next, remove the power cord from the AC outlet.

To prevent fire or shock hazards, do not expose this unit to rain or moisture.



This symbol warns the personnel that un-insulated voltage within the unit may have sufficient magnitude to cause electric shock.



This symbol alerts the personnel that important literature concerning the operation and maintenance of this unit has been included.

Therefore, it should be read carefully in order to avoid any problems.



PRODUCT SAFETY CAUTION

1. When parts replacement is required for servicing, always use the manufacturer's specified replacement.
2. Comply with all caution and safety-related notes on the product display chassis and picture tube.
3. When replacing the component, always be certain that all the components are put back in the place.
4. When servicing display monitor unit, it is required that the provided lead dress is used in the high voltage circuit area.
5. It is also recommended that shatter proof goggles are worn, when removing installing and handling the picture tube. People not equipped with the proper precautionary measures mentioned should keep the picture tube away from body while handling.
6. As for a connector, pick and extract housing with fingers properly since a disconnection and improper contacts may occur, when wires of the connector are led.
7. Use a proper screwdriver. If you use screwdriver that does not fit, you may damage the screws.

8. X-radiation precaution

This product contains critical electrical and mechanical parts essential for X-ray protection.

Normal anode voltage is 27.0 kV at zero beam picture tube current under AC 100-120V/220-240V input, and anode voltage must not exceed the voltages shown below under any operation condition.

To measure anode voltage set brightness for very dim picture, and use a high impedance volt meter between chassis and anode lead and measure high voltage.

If high voltage exceeds the specifications on the chassis schematic diagram, take the necessary corrective action.

Table MAXIMUM ANODE VOLTAGE

| beam current | at 0 mA | at 0.8 mA | at 1.4 mA |
|--------------|---------|-----------|-----------|
| A/B | 34.5 kV | 32.5 kV | 32.3 kV |

9. When you degauss the set with an external degaussing coil, you must keep strictly item “ Notes about degaussing method ” of ADJUSTMENT PROCEDURES.

NEC Flat Enterprise Series

MultiSync® FE700™

User's Manual

You can
register your
product online at
[www.nectech.com/
productregistration](http://www.nectech.com/productregistration)







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| | | |
|--|----------------|---|
|  | WARNING |  |
| <p>TO PREVENT FIRE OR SHOCK HAZARDS, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE. ALSO, DO NOT USE THIS UNIT'S POLARIZED PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLETS UNLESS THE PRONGS CAN BE FULLY INSERTED.</p> <p>REFRAIN FROM OPENING THE CABINET AS THERE ARE HIGH VOLTAGE COMPONENTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p> | | |

| | | |
|--|--|---|
|  | CAUTION |  |
| <p>RISK OF ELECTRIC SHOCK • DO NOT OPEN</p> | | |
| <p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p> | | |
|  | <p>This symbol warns user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside this unit.</p> | |
|  | <p>This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.</p> | |

Canadian Department of Communications Compliance Statement

DOC: This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

C-UL: Bears the C-UL Mark and is in compliance with Canadian Safety Regulations according to C.S.A. 22.2 #950.

FCC Information

1. Use the attached specified cables with the N9705 color monitor so as not to interfere with radio and television reception.
 - (1) Please use the supplied power cable or equivalent to ensure FCC compliance.
 - (2) Shielded captive type signal cable.

Use of other cables and adapters may cause interference with radio and television reception.
2. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult your dealer or an experienced radio/TV technician for help.

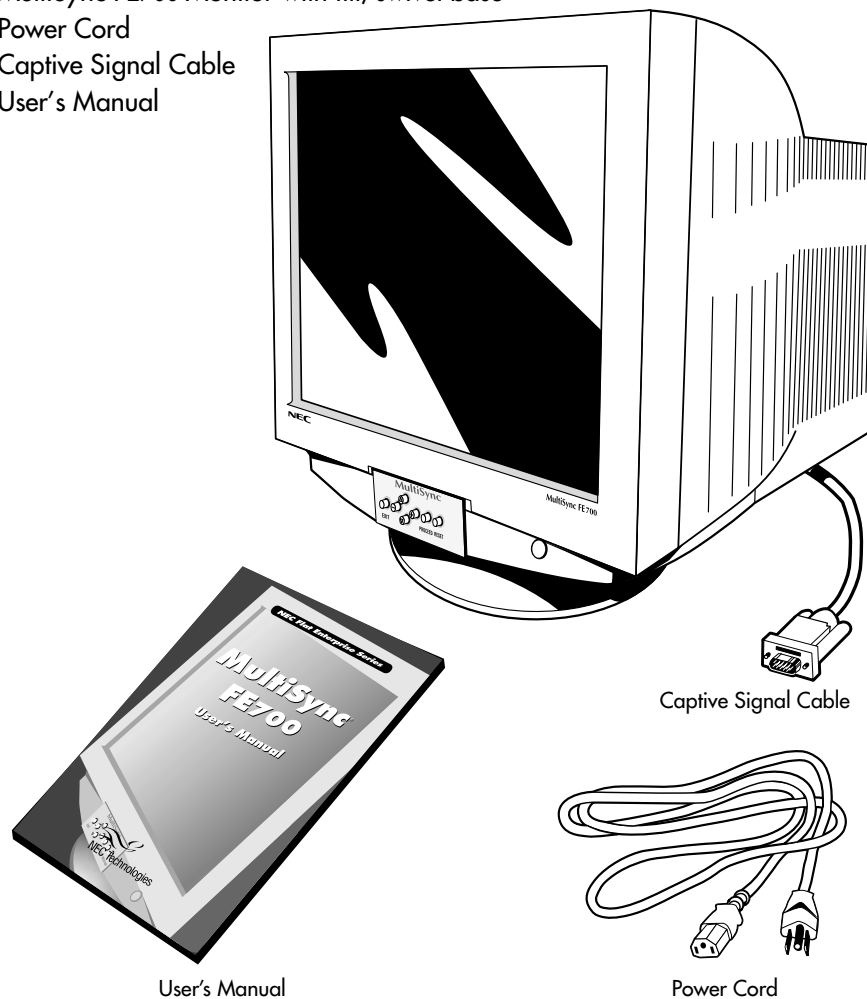
If necessary, the user should contact the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4.

Contents

**You can register your product online at
www.nectech.com/productregistration**

Your new NEC Technologies MultiSync® FE700™ monitor box* should contain the following:

- MultiSync FE700 Monitor with tilt/swivel base
- Power Cord
- Captive Signal Cable
- User's Manual



* Remember to save your original box and packing material to transport or ship the monitor.

Quick Start

To attach the MultiSync® FE700™ Series monitor to your system, follow these instructions:

1. Turn off the power to your computer.
2. If necessary, install the display card into your system. For more information, refer to the display card manual.
3. For the PC: Connect the 15-pin mini D-SUB of the captive signal cable to the connector of the display card in your system (**Figure A.1**). Tighten all screws.
For the Mac: Connect the MultiSync FE700 Macintosh cable adapter (not included) to the monitor connector on the Macintosh (**Figure B.1**). Attach the 15-pin mini D-SUB end of the captive signal cable to the MultiSync FE700 Macintosh cable adapter on the computer (**Figure B.1**). Tighten all screws.

NOTE: To obtain the MultiSync FE700 Macintosh cable adapter, call NEC Technologies at (800) 820-1230.

4. For download information on the Windows® 95/98 INF file for your MultiSync monitor, refer to the **References** section of this User's Manual.
5. Connect one end of the power cord to the MultiSync FE700 monitor and the other end to the power outlet (**Figure C.1**).
6. Turn on the monitor (**Figure D.1**) and the computer.

NOTE: If you have any problems, please refer to the **Troubleshooting** section of this User's Manual.

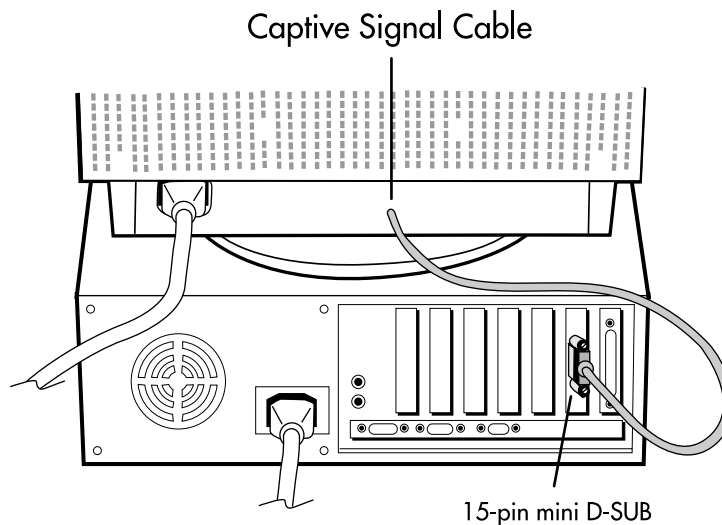


Figure A.1

Quick Start cont.

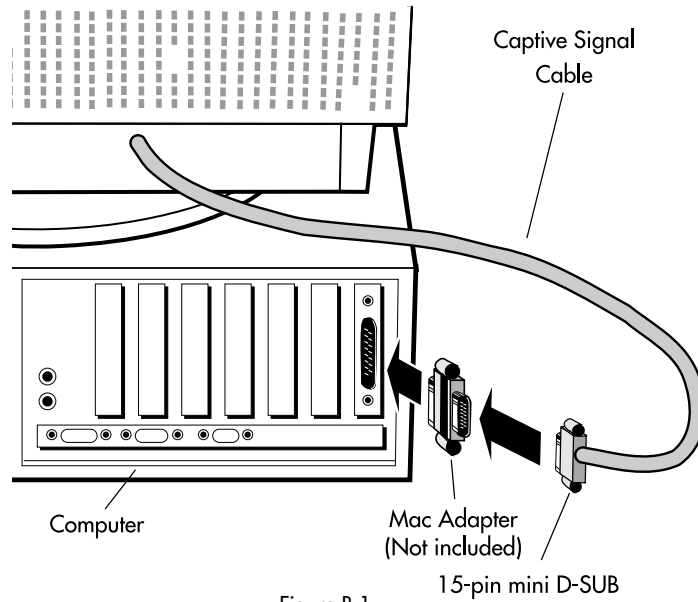


Figure B.1

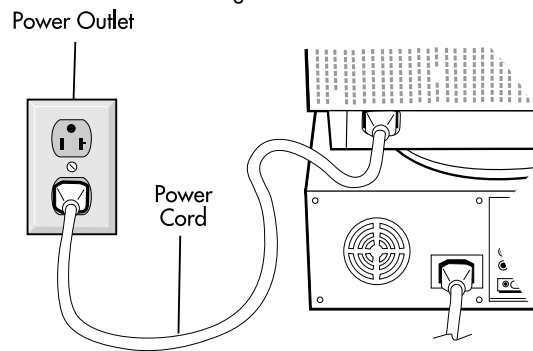


Figure C.1

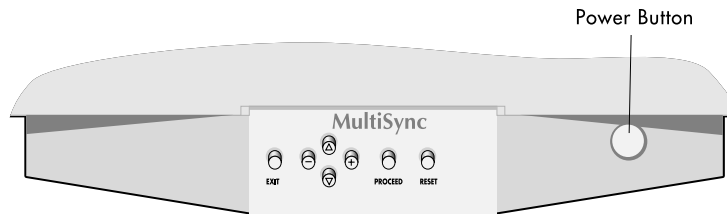


Figure D.1

Controls

OSM™ (On-Screen Manager) control buttons on the front of the monitor function as follows:

| | Main Menu | Sub-Menu |
|-----------------------|---|---|
| EXIT | Exits the OSM menu. | Exits to the OSM controls main menu. |
| CONTROL ▲/▼ | Moves the highlighted area up/down to select one of the controls. | Moves the highlighted area up/down to select one of the controls. |
| CONTROL -/+ | Moves the highlighted area left/right to select one of the controls. | Moves the bar in the – or + direction to decrease or increase the adjustment. |
| PROCEED | Has no function. | Only executes control or enters sub, sub-menu. |
| RESET | Resets all the controls within the highlighted menu to the factory setting. | Resets the highlighted control to the factory setting. |

NOTE: When **RESET** is pressed in the main and sub-menu, a warning window will appear allowing you to cancel the reset function.

When OSM controls are activated, icons are displayed at the top of the menu. If an arrow (➡) is displayed in a sub-menu, it indicates further choices are available. To enter a sub, sub-menu, press **PROCEED**.

Brightness/Contrast Controls

Brightness: Adjusts the overall image and background screen brightness.

Contrast: Adjusts the image brightness in relation to the background.

Degauss: Eliminates the buildup of stray magnetic fields which alter the correct scan of the electron beams and affect the purity of the screen colors, focus and convergence. When activated, your screen image will jump and waver a bit as the screen is demagnetized.

Caution: Please allow a minimum of 20 minutes to elapse between uses of the Degauss Control.

Size and Position Controls

Left/Right: Moves the image horizontally (left or right).

Down/Up: Moves the image vertically (up or down).

Narrow/Wide: Decreases or increases the horizontal size of the image.

Short/Tall: Decreases or increases the vertical size of the image.

Controls cont.

Color Control/AccuColor® Control System

Color presets 1 through 5 selects the desired color setting. The bar is replaced by the color setting choice from 1 to 5. Each color setting is adjusted at the factory to the stated Kelvin. If a setting is adjusted, the name of the setting will change from Kelvin to Custom.

Red, Green, Blue: NEC's AccuColor Control System decreases or increases the monitor's red, green or blue color guns depending upon which is selected. The change in color will appear on screen and the direction (decrease or increase) will be shown by the bars.

Geometry Controls

Geometry Controls Menu

The **Geometry** controls allow you to adjust the curvature or angle of the sides of your display.

Sides In/Out (pincushion): Decreases or increases the curvature of the sides either inward or outward.

Sides Left/Right (pincushion balance): Decreases or increases the curvature of the sides either to the left or right.

Sides Tilt (parallelogram): Decreases or increases the tilt of the sides either to the left or right.

Sides Align (trapezoidal): Decreases or increases the bottom of the screen to be the same as the top.

Rotate (raster rotation): Rotates the entire display clockwise or counterclockwise.

Tools 1

Moiré Canceler: Moiré is a wavy pattern which can sometimes appear on the screen. The pattern is repetitive and superimposed as rippled images. When running certain applications, the wavy pattern is more evident than in others. To reduce moiré, adjust the level by using -/+ CONTROL buttons.

Factory Preset: Selecting Factory Preset allows you a reset most OSM™ control settings back to the factory settings. A warning statement will appear to confirm that you do want to reset ALL settings. Individual settings can be reset by highlighting the control to be reset and pressing the **RESET** button.

Tools 2

Language: OSM controls menus are available in seven languages.

OSM Turn Off: The OSM controls menu will stay on as long as it is in use. In the OSM Turn Off sub-menu, you can select how long the monitor waits after the last touch of a button for the OSM controls menu to disappear. The preset choices are 10, 20, 30, 60 and 120 seconds.

Controls cont.

OSM Lock Out: This control completely locks out access to all OSM controls functions except Brightness and Contrast. When attempting to activate OSM controls while in the lock out mode, a screen will appear indicating that OSM controls are locked out. To activate the OSM Lock Out function, press **PROCEED**, then press **▲** and hold down simultaneously. To deactivate the OSM Lock Out, press **PROCEED**, then press **▲** and hold down simultaneously.

IPM™ System Off Mode: Enable: The IPM System works normally and all stages of energy savings are utilized.
 Disable: The Off Mode of the IPM System is not used.

NOTE: For standard systems and graphics boards, keep the factory setting at ENABLE.

Refresh Notifier: A message will advise you if the refresh rate of the signal being applied to the monitor by the computer is too low. For further information, please refer to your display card or system manual.

Information

Display Mode: Indicates the current mode and frequency setting of the monitor.

Monitor Info: Indicates the model and serial numbers of your monitor.

Recommended Use

Safety Precautions and Maintenance



FOR OPTIMUM PERFORMANCE, PLEASE NOTE THE FOLLOWING WHEN SETTING UP AND USING THE MULTISYNC® FE700™ COLOR MONITOR:



- **DO NOT OPEN THE MONITOR.** There are no user serviceable parts inside and opening or removing covers may expose you to dangerous shock hazards or other risks. Refer all servicing to qualified service personnel.
- Do not spill any liquids into the cabinet or use your monitor near water.
- Do not insert objects of any kind into the cabinet slots, as they may touch dangerous voltage points, which can be harmful or fatal or may cause electric shock, fire or equipment failure.
- Do not place any heavy objects on the power cord. Damage to the cord may cause shock or fire.
- Do not place this product on a sloping or unstable cart, stand or table, as the monitor may fall, causing serious damage to the monitor.
- Keep the monitor away from high capacity transformers, electric motors and other devices such as external speakers or fans, which may create strong magnetic fields.
- If possible, position the monitor so that it is facing the east to minimize the effects of the earth's magnetic field.
- Changing the direction of the monitor while it is powered on may cause image discoloration. To correct this, turn the monitor off for 20 minutes before powering it back on.
- When operating the MultiSync FE700 with its AC 220-240V worldwide power supply, use a power supply cord that matches the power supply voltage of the AC power outlet being used. The power supply cord you use must have been approved by and comply with the safety standards of your country. (Type H05VV-F should be used except in UK)
- In UK, use a BS-approved power cord with molded plug having a black (SA) fuse installed for use with this monitor. If a power cord is not supplied with this monitor, please contact your supplier.

Immediately unplug your monitor from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- When the power supply cord or plug is damaged.
- If liquid has been spilled, or objects have fallen into the monitor.
- If the monitor has been exposed to rain or water.
- If the monitor has been dropped or the cabinet damaged.
- If the monitor does not operate normally by following operating instructions.
- Allow adequate ventilation around the monitor so that heat can properly dissipate. Do not block ventilated openings or place the monitor near a radiator or other heat sources. Do not put anything on top of monitor.
- The power cable connector is the primary means of detaching the system from the power supply. The monitor should be installed close to a power outlet which is easily accessible.
- Handle with care when transporting. Save packaging for transporting.



CAUTION

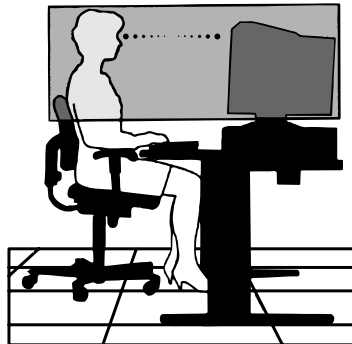
Recommended Use cont.



CORRECT PLACEMENT AND ADJUSTMENT OF THE MONITOR CAN REDUCE EYE, SHOULDER AND NECK FATIGUE. CHECK THE FOLLOWING WHEN YOU POSITION THE MONITOR:



- Adjust the monitor height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.
- Position your monitor no closer than 16 inches and no further away than 24 inches from your eyes. The optimal distance is 20 inches.
- Rest your eyes periodically by focusing on an object at least 20 feet away. Blink often.
- Position the monitor at a 90° angle to windows and other light sources to minimize glare and reflections. Adjust the monitor tilt so that ceiling lights do not reflect on your screen.
- If reflected light makes it hard for you to see your screen, use an anti-glare filter.
- Clean your monitor regularly. Use a lint-free, non-abrasive cloth and a non-alcohol, neutral, non-abrasive cleaning solution or glass cleaner to minimize dust.
- Adjust the monitor's brightness and contrast controls to enhance readability.
- Use a document holder placed close to the screen.
- Position whatever you are looking at most of the time (the screen or reference material) directly in front of you to minimize turning your head while you are typing.
- Get regular eye checkups.



Ergonomics

To realize the maximum ergonomics benefits, we recommend the following:

- Adjust the Brightness until the background raster disappears
- Do not position the Contrast control to its maximum setting
- Use the preset Size and Position controls with standard signals
- Use the preset Color Setting and Sides Left/Right controls
- Use non-interlaced signals with a vertical refresh rate between 75-120Hz
- Do not use primary color blue on a dark background, as it is difficult to see and may produce eye fatigue due to insufficient contrast

For more detailed information on setting up a healthy work environment, call NEC at (800) 820-1230, NEC FastFacts™ information at (630) 467-4363 and request document #900108 or write the American National Standard for Human Factors Engineering of Visual Display Terminal Workstations – ANSI-HFS Standard No. 100-1988 – The Human Factors Society, Inc. P.O. Box 1369, Santa Monica, California 90406.

Specifications

| Monitor Specifications | | MultiSync® FE700™ Monitor | Notes |
|---|--|--|--|
| Picture Tube | Diagonal: Viewable Image Size: Radius: | 17 inch 16 inch 50,000 mm | 90° deflection, 0.25 mm grille pitch, medium short persistence phosphor, aperture grille CRT, multi-layered, anti-static screen coating, dark-tint screen and OptiClear® screen. |
| Input Signal | Video: Sync: | ANALOG 0.7 Vp-p/75 Ohms Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative Composite sync. (Positive/Negative) (TTL Level) | |
| Display Colors | Analog input: | Unlimited number of Colors | Depends on display card used. |
| Synchronization Range | Horizontal: Vertical: | 31 kHz to 70 kHz 55 Hz to 120 Hz | Automatically Automatically |
| Resolutions Supported Resolution based on horizontal and vertical frequencies only | | 640 x 480 @ 60 to 120 Hz 800 x 600 @ 55 to 110 Hz 832 x 624 @ 55 to 105 Hz 1024 x 768 @ 55 to 87 Hz 1152 x 870 @ 55 to 77 Hz 1280 x 1024 @ 55 to 66 Hz | Some systems may not support all modes listed. NEC cites recommended resolution at 85 Hz for optimal display performance. |
| Active Display Area (Factory Setting) | Horizontal: Vertical: | 315 mm/12.4 inches 236 mm/9.3 inches | Dependent upon signal timing used, and does not include border area. |
| Active Display Area (Full Scan) | | 325 mm/12.8 inches 243 mm/9.6 inches | Dependent upon signal timing used, and does not include border area. |
| Power Supply | | AC 100 – 240 V, 50/60 Hz | |
| Current Rating | | 1.8A @ 100-240 V | |
| Dimensions | | 403 mm (W) x 427 mm (H) x 424 mm (D) 15.9 inches (W) x 16.8 inches (H) x 16.7 inches (D) | |
| Weight | | 19.0 kg 41.9 lbs | |
| Environmental Considerations | | Operating Temperature: Humidity: Feet: Storage Temperature: Humidity: Feet: | +10°C to +35°C / +50°F to +90°F 30% to 80% 0 to 10,000 Feet -20°C to +60°C / -4°F to +140°F 10% to 90% 0 to 45,000 Feet |

NOTE: Technical specifications are subject to change without notice.

Features

Flat Aperture Grille CRT: Delivers an unparalleled viewing experience with a virtually flat image, eliminating distortion and reducing glare so that what you see on-screen is what you get on your printed output. The striped phosphor alignment of the CRT delivers superior vertical definition with improved brightness for more uniform image contrast.

OptiClear® Screen Surface: Reduces reflection and glare and increases contrast without sacrificing focus level, clarity or brightness. Along with the flat square technology CRT, a high contrast screen with 0.25 mm grille pitch delivers crisp, clean text and graphics.

Dual Dynamic Beam Focus: Provides precise, continuous focus adjustments of the electron beams and optimum image quality, even to the far edges of the screen.

AccuColor® Control System: Allows you to change between five color settings on your display to match your personal preference.

OSM™ (On-Screen Manager) Controls: Allows you to quickly and easily adjust all elements of your screen image via simple to use on-screen menus.

ErgoDesign® Features: Enhances human ergonomics to improve the working environment, protect the health of the user and save money. Examples include OSM controls for quick and easy image adjustments, tilt/swivel base for preferred angle of vision and compliance with MPRII guidelines for lower emissions.

Plug and Play: The Microsoft® solution with the Windows®95/98 operating system facilitates setup and installation by allowing the monitor to send its capabilities (such as screen size and resolutions supported) directly to your computer, automatically optimizing display performance.

IPM™ (Intelligent Power Manager) System: Provides innovative power-saving methods that allow the monitor to shift to a lower power consumption level when on but not in use, saving two-thirds of your monitor energy costs, reducing emissions and lowering the air conditioning costs of the workplace.

Reduced Magnetic Field™ Technology: Reduces magnetic and alternating electric field emissions and static electricity, addressing ergonomic concerns regarding potential risks from extended computer monitor use.

Multiple Frequency Technology: Automatically adjusts monitor to the display card's scanning frequency, thus displaying the resolution required.

FullScan™ Capability: Allows you to use the entire screen area in most resolutions, significantly expanding image size.

OSM Display Screen Copyright 1999 by NEC Technologies, Inc.

Troubleshooting

No picture

- Display card should be completely seated in its slot.
- Power Button and computer power switch should be in the ON position.
- Signal cable should be completely connected to display card/computer.
- Check connector for bent or pushed-in pins.

Image is scrolling or unstable

- Signal cable should be completely attached to the computer.
- Check pin assignments and signal timings of the monitor and your display card with respect to recommended timings and pin assignments.
- If the Macintosh cable adapter is used, check for proper connection or make sure the display card is Macintosh compatible and that the card is properly seated in the computer.

LED on monitor is not lit *(no green, orange, yellow color can be seen)*

- Power Switch should be in the ON position and power cord should be connected.

Picture is fuzzy or color looks blotchy

- Adjust Brightness and Contrast Controls.
- Access the Degauss Control through OSM™ controls. Activate the Degauss Control.

CAUTION: A minimum interval of 20 minutes should elapse before the Degauss Control is used a second time when not switching between modes.

Picture bounces or a wavy pattern is present in the picture

- Move electrical devices that may be causing electrical interference away from the monitor.
- See inside cover of User's Manual for FCC information.

Edges of the display image are not square

- Use the OSM Geometry Controls to straighten the edges.
- If possible, position the front of the monitor facing east.

Display image is not centered, too small, or too large

- Use the OSM Size and Position Controls to adjust the image.

Thin lines appear on your screen

- Thin lines are normal for an aperture grille CRT and are not a malfunction. These are shadows from the damper wires used to stabilize the aperture grille and are most noticeable when the screen's background is light (usually white).

References

- **BBS (978) 742-8706**

NEC Technologies' Remote Bulletin Board System is an electronic service accessible with your system and a modem. Communication parameters are: 300/1200/2400/9600/14.4k/28.8k bps, no parity, 8-data bits, 1 stop bit

- **Customer Service/ Technical Support (800) 632-4662**
Fax (978) 742-7049

- **Electronic Channels:**

Internet e-mail: tech-support@necotech.com
Internet ftp site: ftp.necotech.com
World Wide Web: http://www.necotech.com
Product Registration: http://www.necotech.com/productregistration
Windows® 95/98 INF File: http://cssweb.necotech.com/common/drivers.htm
then download the file NECMSINF.ZIP.

- **FastFacts™ Information (630) 467-4363**

| INFORMATION | DESCRIPTION | DOCUMENT # |
|--------------------------|---|------------|
| Glossary | Definition of terms related to functions, features and installation of the MultiSync monitor | 900203 |
| More Information | Names and addresses of other groups involved in standards and features of the MultiSync monitor | 900204 |
| Macintosh Connection | Detailed information on connecting the MultiSync monitor to a Macintosh | 153006 |
| Healthy Work Environment | Detailed information on setting up a healthy work environment | 900108 |

- **Literature & Sales Info (800) NEC-INFO [(800) 632-4636]**

- **MultiSync Fulfillment (800) 820-1230**
[For software & accessories]

- **TeleSales (800) 284-4484**

Limited Warranty

NEC Technologies, Inc. (hereinafter "NECTECH"), warrants this Product to be free from defects in material and workmanship and, subject to the conditions set forth below, agrees to repair or replace (at NECTECH's sole option) any part of the enclosed unit which proves defective for a period of three (3) years from the date of first consumer purchase. Spare parts are warranted for ninety (90) days. Replacement parts or units may be new or refurbished and will meet specifications of the original parts or unit.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty is limited to the original purchaser of the Product and is not transferable. This warranty covers only NECTECH-supplied components. Service required as a result of third party components is not covered under this warranty. In order to be covered under this warranty, the Product must have been purchased in the U.S.A. or Canada by the original purchaser. This warranty only covers Product distribution in the U.S.A. or Canada by NECTECH. No warranty service is provided outside of the U.S.A. or Canada. Proof of Purchase will be required by NECTECH to substantiate date of purchase. Such proof of purchase must be an original bill of sale or receipt containing name and address of seller, purchaser, and the serial number of the product.

It shall be your obligation and expense to have the Product shipped, freight prepaid, or delivered to the authorized reseller from whom it was purchased or other facility authorized by NECTECH to render the services provided hereunder in either the original package or a similar package affording an equal degree of protection. All Products returned to NECTECH for service MUST have prior approval, which may be obtained by calling 1-800-632-4662.

The Product shall not have been previously altered, repaired, or serviced by anyone other than a service facility authorized by NECTECH to render such service, the serial number of the product shall not have been altered or removed. In order to be covered by this warranty the Product shall not have been subjected to displaying of fixed images for long periods of time resulting in image persistence (afterimage effects), accident, misuse or abuse or operated contrary to the instructions contained in the User's Manual. Any such conditions will void this warranty.

NECTECH SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHER TYPES OF DAMAGES RESULTING FROM THE USE OF ANY NECTECH PRODUCT OTHER THAN THE LIABILITY STATED ABOVE. THESE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE EXCLUSIONS OR LIMITATIONS MAY NOT APPLY TO YOU.

This Product is warranted in accordance with the terms of this limited warranty. Consumers are cautioned that Product performance is affected by system configuration, software, the application, customer data, and operator control of the system, among other factors. While NECTECH Products are considered to be compatible with many systems, specific functional implementation by the customers of the Product may vary. Therefore, suitability of a Product for a specific purpose or application must be determined by consumer and is not warranted by NECTECH.

For the name of your nearest authorized NECTECH service facility, contact NECTECH at 1-800-632-4662.

TCO'99

Congratulations! You have just purchased a TCO'99 approved and labeled product! Your choice has provided you with a product developed for professional use. Your purchase has also contributed to reducing the burden on the environment and also to the further development of environmentally adapted electronics products.



Why do we have environmentally labelled computers?

In many countries, environmental labelling has become an established method for encouraging the adaptation of goods and services to the environment. The main problem, as far as computers and other electronics equipment are concerned, is that environmentally harmful substances are used both in the products and during the manufacturing. Since it has not been possible for the majority of electronics equipment to be recycled in a satisfactory way, most of these potentially damaging substances sooner or later enter Nature.

There are also other characteristics of a computer, such as energy consumption levels, that are important from the viewpoints of both the work (Internal) and natural (external) environments. Since all methods of conventional electricity generation have a negative effect on the environment (acidic and climate-influencing emissions, radioactive waste, etc.), it is vital to conserve energy. Electronics equipment in offices consume an enormous amount of energy since they are often left running continuously.

What does labelling involve?

This product meets the requirements for the TCO'99 scheme which provides for international and environmental labelling of personal computers. The labelling scheme was developed as a joint effort by the TCO (The Swedish Confederation of Professional Employees), Svenska Naturskyddsforeningen (The Swedish Society for Nature Conservation) and Statens Energimyndighet (The Swedish National Energy Administration).

The requirements cover a wide range of issues: environment, ergonomics, usability, emission of electrical and magnetic fields, energy consumption and electrical and fire safety.

The environmental demands concern restrictions on the presence and use of heavy metals, brominated and chlorinated flame retardants, CFCs (freons) and chlorinated solvents, among other things. The product must be prepared for recycling and the manufacturer is obliged to have an environmental plan which must be adhered to in each country where the company implements its operational policy. The energy requirements include a demand that the computer and/or display, after a certain period of inactivity, shall reduce its power consumption to a lower level in one or more stages. The length of time to reactivate the computer shall be reasonable for the user.

Labelled products must meet strict environmental demands, for example, in respect of the reduction of electric and magnetic fields, physical and visual ergonomics and good usability.

Environmental Requirements

Flame retardants

Flame retardants are present in printed circuit boards, cables, wires, casings and housings. In turn, they delay the spread of fire. Up to thirty percent of the plastic in a computer casing can consist of flame retardant substances. Most flame retardants contain bromine or chloride and these are related to another group of environmental toxins, PCBs, which are suspected to give rise to severe health effects, including reproductive damage in fish-eating birds and mammals, due to the bio-

TCO'99 cont.

accumulative* processes. Flame retardants have been found in human blood and researchers fear that disturbances in foetus development may occur.

TCO'99 demand requires that plastic components weighing more than 25 grams must not contain flame retardants with organically bound chlorine and bromine. Flame retardants are allowed in the printed circuit boards since no substitutes are available.

Lead**

Lead can be found in picture tubes, display screens, solders and capacitors. Lead damages the nervous system and in higher doses, causes lead poisoning.

TCO'99 requirement permits the inclusion of lead since no replacement has yet been developed.

Cadmium**

Cadmium is present in rechargeable batteries and in the colourgenerating layers of certain computer displays. Cadmium damages the nervous system and is toxic in high doses.

TCO'99 requirement states that batteries, the colourgenerating layers of display screens and the electrical or electronics components must not contain any cadmium.

Mercury**

Mercury is sometimes found in batteries, relays and switches, Mercury damages the nervous system and is toxic in high doses.

TCO'99 requirement states that batteries may not contain any Mercury. It also demands that no mercury is present in any of the electrical or electronics components associated with the display unit.

CFCs (freons)

CFCs (freons) are sometimes used for washing printed circuit boards. CFCs break down ozone and thereby damage the ozone layer in the stratosphere, causing increased reception on Earth of ultraviolet light with consequent increased risks of skin cancer (malignant melanoma).

The relevant TCO'99 requirement; Neither CFCs nor HCFCs may be used during the manufacturing and assembly of the product or its packaging.

*Bio-accumulative is defined as substances which accumulate within living organisms.

**Lead, Cadmium and Mercury are heavy metals which are Bio-accumulative.

To obtain complete information on the environmental criteria document, order from:

TCO Development Unit
SE-114 94 Stockholm
SWEDEN
FAX Number: +46 8 782 92 07
E-mail (Internet): development@tco.se

You may also obtain current information on TCO'99 approved and labelled products by visiting their website at: <http://www.tco-info.com/>

Declaration of the Manufacturer

We hereby certify that the color monitor
MultiSync® FE700™ (N9705) is in

compliance with

Council Directive 73/23/EEC:

- EN 60950

Council Directive 89/336/EEC:

- EN 55022
- EN 60555-2
- EN 61000-3-3
- EN 50082-1
(IEC-801-2)
(IEC-801-3)
(IEC-801-4)

and marked with



NEC Home Electronics, LTD.
686-1, NISHIOI OI-MACHI,
ASHIGARAKAMI-GUN
KANAGAWA 258-8533, JAPAN

Röntgenstrahlung

Die in diesem Gerät erzeugten Röntgenstrahlen sind durch die eigensichere Kathodenstrahlröhre ausreichend abgeschirmt.

Unsachgemäße Eingriffe, insbesondere Verändern der Hochspannung oder Einbau eines anderen Bildröhrentyps, können dazu führen, daß Röntgenstrahlung in erheblicher Stärke auftritt. So veränderte Geräte entsprechen nicht mehr dieser Zulassung und dürfen nicht betrieben werden.



AVERTISSEMENT



AFIN D'ÉVITER TOUT RISQUE D'INCENDIE OU D'ÉLECTROCUTION, NE PAS EXPOSER CET APPAREIL À LA PLUIE OU À L'HUMIDITÉ. NE PAS UTILISER LA FICHE D'ALIMENTATION POLARISÉE AVEC UNE PRISE DE CORDON DE RALLONGE OU AUTRE PRISE SAUF SI LES BROCHES PEUVENT ÊTRE ENTIÈREMENT INTRODUITES.
NE PAS OUVRIR LE BOÎTIER, LEQUEL CONTIENT DES COMPOSANTS À HAUTE TENSION. CONFIER TOUS TRAVAUX À DU PERSONNEL TECHNIQUE QUALIFIÉ.



ATTENTION



RISQUE DE DÉCHARGE ÉLECTRIQUE • NE PAS OUVRIR

ATTENTION : POUR ÉVITER TOUT RISQUE D'ÉLECTROCUTION, NE PAS OUVRIR LE COUVERCLE (L'ARRIÈRE). À L'INTÉRIEUR, AUCUNE PIÈCE NE NÉCESSITE L'INTERVENTION DE L'UTILISATEUR. EN CAS DE PROBLÈME, S'ADRESSER À DU PERSONNEL TECHNIQUE QUALIFIÉ.



Ce symbole est une mise en garde contre les risques d'électrocution que présentent certaines parties dépourvues d'isolation à l'intérieur de l'appareil. Il est donc dangereux d'établir le moindre contact avec ces parties.



Ce symbole prévient l'utilisateur que des directives d'utilisation et de maintenance de cet appareil sont fournies avec ce guide d'utilisateur. Par conséquent, celles-ci doivent être lues attentivement pour éviter tout incident.

Déclaration de conformité – Département des Communications du Canada

DOC : Cet appareil numérique de classe B respecte toutes les exigences du Règlement sur le matériel à l'origine d'interférences du Canada.

C-UL : Ce produit porte la marque «C-UL» et se conforme aux règlements de sûreté canadiens selon CAN/CSA 22.2 No. 950.

Informations FCC

1. Utiliser les câbles spécifiés fournis avec le moniteur couleur N9705 afin de ne pas provoquer d'interférences avec la réception radio et télévision.

(1) Prière d'utiliser le câble d'alimentation fourni ou équivalent pour assurer la conformité FCC.

(2) Prière d'utiliser le câble de signal captif.

L'utilisation d'autres câbles et adaptateurs peut provoquer des interférences avec la réception radio et télévision.

2. Cet appareil a été testé et s'avère conforme avec les spécifications d'équipements de Classe B, section 15 de la réglementation FCC. Ces spécifications ont été établies pour garantir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Cet appareil génère, utilise et peut émettre des fréquences radio et, s'il n'est pas installé et utilisé selon les directives de ce guide, il peut perturber les communications radio. Cependant, il n'est pas garanti qu'aucune interférence ne se produira dans une installation donnée.

Si cet appareil provoque des interférences nuisibles à la réception radio ou télévision, ce que vous pouvez déterminer en allumant et en éteignant l'appareil, essayez de remédier au problème en prenant une ou plusieurs des mesures suivantes :

- Réorienter ou repositionner l'antenne de réception.
- Augmenter la distance entre l'appareil et le récepteur.
- Connecter l'appareil à une prise de courant sur un circuit différent de celui sur lequel le récepteur est connecté.
- Consulter son revendeur ou un technicien radio/TV pour obtenir de l'aide.

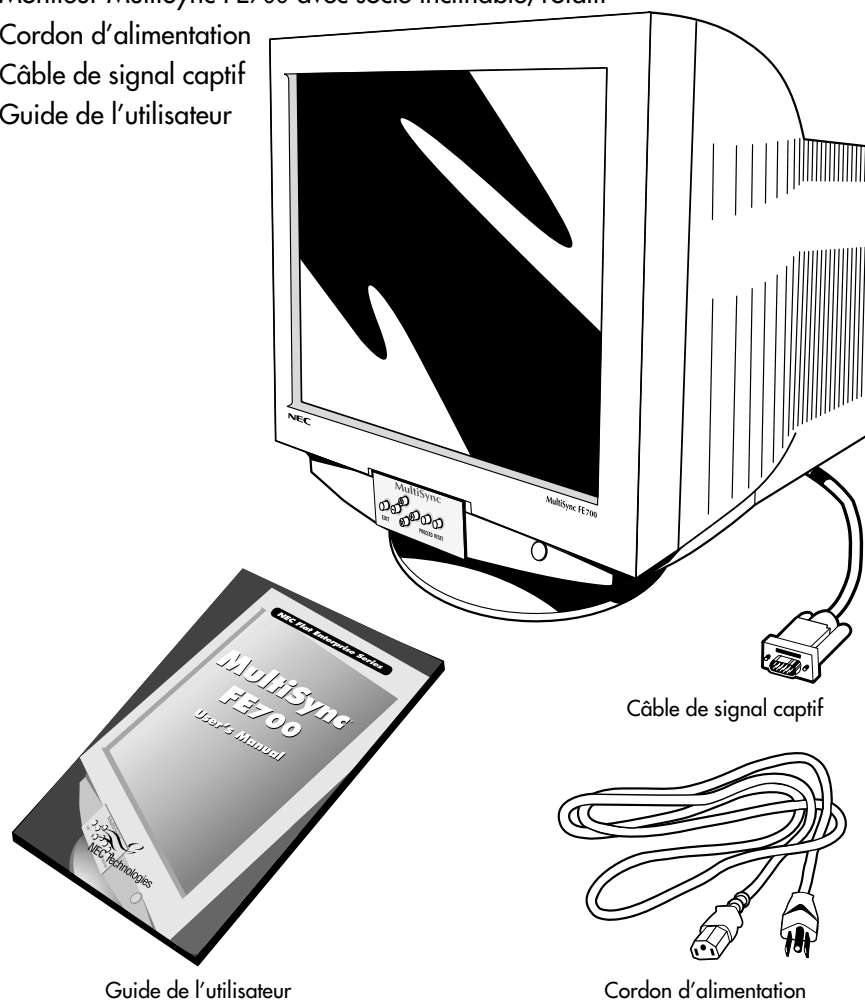
Si nécessaire, l'utilisateur doit contacter le revendeur ou un technicien radio/TV afin d'obtenir des informations supplémentaires. L'utilisateur peut se procurer le livret utile suivant, préparé par la Federal Communications Commission : «How to Identify and Resolve Radio-TV Interference Problems» (Comment cerner et résoudre les problèmes d'interférences radio/TV). Ce livret est disponible auprès du U.S. Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4.

Contenu

**Votre produit peut être enregistré sur Internet à l'adresse
<http://www.nectech.com/productregistration>**

La boîte* de votre nouveau moniteur NEC Technologies MultiSync® FE700^{MC} contient :

- Moniteur MultiSync FE700 avec socle inclinable/rotatif
- Cordon d'alimentation
- Câble de signal captif
- Guide de l'utilisateur



* Ne pas oublier de conserver la boîte et le matériel d'emballage d'origine pour transporter ou expédier le moniteur.

Mise en marche rapide

Pour raccorder le moniteur MultiSync® FE700^{MC} au système, suivre les directives ci-après :

1. Mettre l'ordinateur hors tension.
2. Si nécessaire, installer la carte vidéo dans le système. Pour plus d'informations, se reporter au guide de l'utilisateur de la carte vidéo.
3. Pour le PC : Connecter la mini-fiche D-SUB à 15 broches du câble de signal captif au connecteur de la carte vidéo du système (**Figure A.1**). Serrer toutes les vis.

Pour le Mac : Connecter l'adaptateur de câble MultiSync FE700 Macintosh (non fourni) au connecteur de moniteur sur le Macintosh (**Figure B.1**). Fixer l'extrémité de la mini-fiche D-SUB à 15 broches du câble de signal captif à l'adaptateur de câble MultiSync MultiSync FE700 Macintosh sur l'ordinateur (**Figure B.1**). Serrer toutes les vis.

REMARQUE : Pour obtenir un adaptateur de câble MultiSync FE700^{MC} Macintosh, appeler NEC Technologies au (800) 820-1230.

4. Pour les informations de téléchargement sur le fichier INF Windows® 95/98 pour le moniteur MultiSync, se reporter à la section **Références** de ce guide.
5. Connecter une extrémité du cordon d'alimentation au moniteur MultiSync FE700 et l'autre extrémité à la prise de courant (**Figure C.1**).
6. Allumer le moniteur (**Figure D.1**) et l'ordinateur.

REMARQUE : En cas de problème, prière de se reporter à la section **Dépannage** de ce guide.

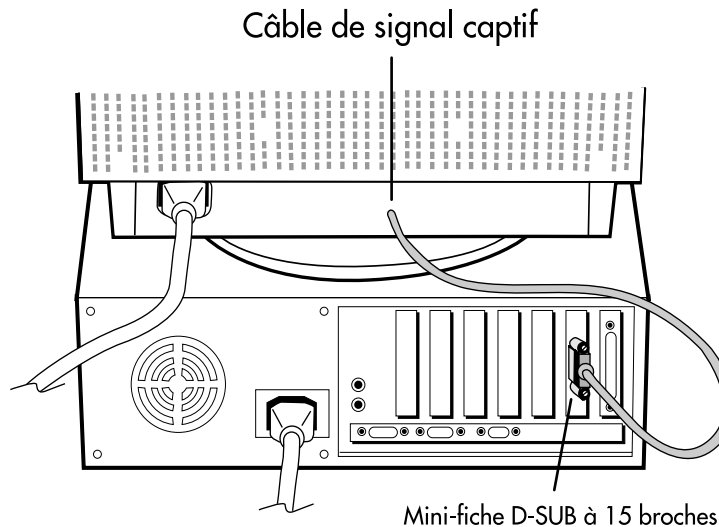


Figure A.1

Mise en marche rapide (suite)

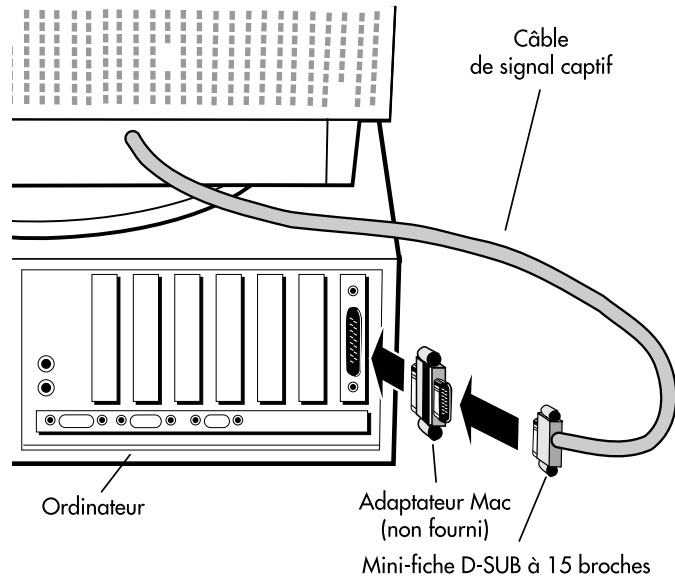


Figure B.1

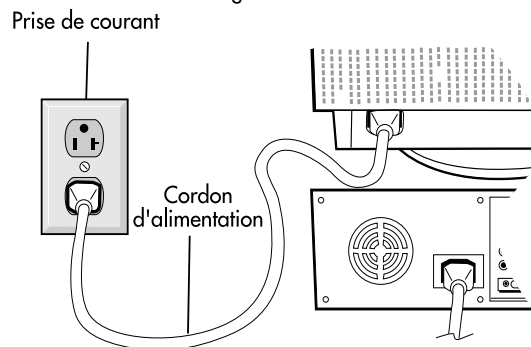


Figure C.1

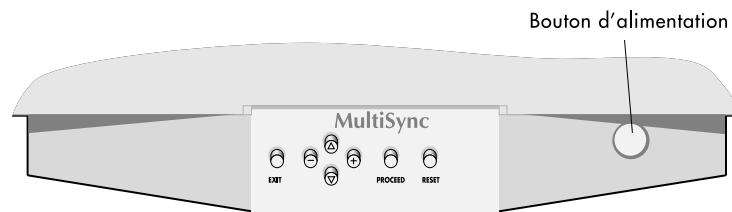



Figure D.1

Commandes

Les touches de commandes OSM^{MC} (Gestionnaire à l'écran) à l'avant du moniteur fonctionnent comme suit :

| | Menu principal | Sous-menu |
|---|---|--|
| EXIT | Quitte le menu OSM. | Retour au menu principal OSM. |
| CONTROL  | Déplace la zone en surbrillance vers le haut/le bas pour sélectionner une des commandes. | Déplace la zone en surbrillance vers le haut/le bas pour sélectionner une des commandes. |
| CONTROL -/+ | Déplace la zone en surbrillance vers la gauche/la droite pour sélectionner une des commandes. | Déplace le curseur vers le + ou - pour augmenter ou diminuer la valeur du réglage. |
| PROCEED | Pas de fonction. | Permet d'accéder à un sous-menu ou d'exécuter un réglage. |
| RESET | Rappel des paramètres usine du menu en surbrillance. | Rappel des paramètres usine de tous les réglages. |
| NOTA : | En appuyant sur le bouton RESET dans le menu ou dans un sous-menu, une fenêtre apparaîtra pour confirmer ou annuler cette opération. | |

Lorsque les commandes OSM sont activées, des icônes sont affichées au sommet du menu. Si une flèche (→) est affichée dans un sous-menu, elle indique que d'autres choix sont disponibles. Pour entrer dans un sous-menu, appuyez sur PROCEED.

Commandes de luminosité/contraste

Luminosité : Règle la luminosité de l'image générale et de l'écran d'arrière-plan.

Contraste : Règle la luminosité de l'image par rapport à l'arrière-plan.

Démagnétisation : Élimine l'accumulation de champs magnétiques parasites qui modifieraient le balayage correct du faisceau d'électrons et affecteraient la pureté des couleurs de l'écran, la netteté et la convergence. Lorsque cette commande est activée, l'image saute et tremble quelque peu pendant la démagnétisation de l'écran.

Attention : Prière de laisser s'écouler un minimum de 20 minutes entre chaque utilisation de la commande Degauss.

Commandes de format et de position

Gauche/Droite : Déplace l'image horizontalement (vers la gauche ou vers la droite).

Bas/Haut : Déplace l'image verticalement (vers le haut ou vers le bas).

Étroit/Large : Augmente ou diminue le format horizontal de l'image.

Petit/Grand : Augmente ou diminue le format vertical de l'image.

Commandes (suite)

Système de commande de couleurs/ Système de commande AccuColor®

Sélectionnez le réglage couleur au moyen des réglages préprogrammés 1 à 5. La barre est remplacée par le réglage couleur initial de 1 à 5. Chaque réglage couleur préprogrammé est exprimé en Kelvin. Si un préréglage est modifié, le message «Custom» (au choix) s'affiche et remplace la température en Kelvin.

Rouge, vert, bleu : Augmente ou diminue la valeur des couleurs rouge, vert, bleu en fonction de celle qui a été sélectionnée. Le changement du réglage de la couleur apparaît à l'écran et le sens (augmentation ou diminution) du réglage est indiqué par la barre de progression.

Commandes du menu Géométrie

Les commandes du menu **Géométrie** permettent de régler la courbure ou l'angle des côtés de l'affichage.

Int/Ext (coussin) : Augmente ou diminue la courbure des côtés vers l'intérieur ou vers l'extérieur.

Gauche/Droite (balance de la distorsion du coussin) : Augmente ou diminue la courbure des côtés vers la gauche ou vers la droite.

Pente (distorsion de parallélogramme) : Augmente ou diminue l'inclinaison des côtés vers la gauche ou vers la droite.

Alignement (distorsion du trapèze) : Augmente ou diminue le dessous de l'écran pour qu'il soit le même que le dessus.

Rotation (rotation de balayage) : Fait pivoter tout l'affichage dans le sens horaire ou dans le sens antihoraire.

Outils 1

Éliminateur de Moiré : Moiré est un motif ondulé qui peut s'afficher à l'écran de temps à autre. Ce motif est répétitif et se superpose sous forme d'images ondulées. Ce phénomène peut être plus prononcé avec certaines applications. Pour réduire le motif Moiré, réglez les valeurs Horizontal et/ou Vertical à l'aide des boutons CONTROL -/+.

Préréglage usine : Cette fonction vous permet de remettre tous les paramètres de l'OSM^{MC} à leur état d'origine. Une fenêtre d'alerte vous demandera de confirmer si vous désirez rappeler tous les réglages usine. Les réglages individuels peuvent être réinitialisés en mettant en surbrillance la commande à réinitialiser, puis en appuyant sur le bouton **RESET**.

Outils 2

Langage : Les menus de l'OSM sont disponibles en sept langues.

Extinction de l'OSM : Le menu de l'OSM restera actif aussi longtemps que vous l'utiliserez. Dans le menu d'extinction de l'OSM, vous pouvez choisir le temps que mettra l'affichage pour s'effacer après la dernière pression sur une touche. Les temps préréglés sont de 10, 20, 30, 60 et de 120 secondes.

Commandes (suite)

Verrouillage de l'OSM : Cette fonction vous permet de verrouiller l'accès aux fonctions de l'OSM sauf le contrôle du contraste et de la luminosité. En essayant d'accéder au menu lorsqu'il est verrouillé, une fenêtre s'ouvrira à l'écran et vous indiquera que les réglages ne sont pas accessibles. Pour verrouiller, appuyer sur les touches **PROCEED** et ▲ simultanément. Pour déverrouiller, appuyer sur les touches **PROCEED** et ▲ simultanément.

IPM^{MC} : Activé : Le système IPM fonctionne normalement et toutes les étapes de sauvegarde d'énergie sont utilisées.
 Désactivé : Le système IPM n'est pas utilisé.

REMARQUE : Pour les systèmes standard et les cartes graphiques, laisser les réglages d'usine sur ENABLE.

Fréquence Verticale : si le taux de rafraîchissement est trop bas, un message apparaîtra à cet effet. Pour plus d'informations, reportez-vous à la carte vidéo ou au manuel du système.



Information

Mode d'affichage : Le menu mode d'affichage vous renseigne sur le mode et la fréquence courante du moniteur.

Information Écran : Le numéro du modèle et le numéro de série y sont indiqués.

Usage recommandé

Consignes de sécurité et d'entretien



POUR UN FONCTIONNEMENT OPTIMAL, PRIÈRE DE NOTER
CE QUI SUIT POUR LE RÉGLAGE ET L'UTILISATION DU
MONITEUR COULEUR MULTISYNC® FE700^{MC} :



- **NE PAS OUVRIR LE MONITEUR.** Aucune pièce intérieure ne nécessite l'intervention de l'utilisateur, et l'ouverture ou la dépose des couvercles peut entraîner des risques de décharges électriques dangereuses ou d'autres risques. Confier tous travaux à du personnel technique qualifié.
- Ne pas renverser de liquides dans le boîtier, ni utiliser le moniteur près de l'eau.
- Ne pas introduire d'objets de quelque nature que ce soit dans les fentes du boîtier car ceux-ci pourraient toucher des endroits sous tension dangereuse, ce qui peut provoquer des blessures, voire être fatal, ou peut occasionner une décharge électrique, un incendie ou une panne de l'appareil.
- Ne pas placer d'objets lourds sur le cordon d'alimentation. Un cordon endommagé peut occasionner une décharge électrique ou un incendie.
- Ne pas placer cet appareil sur un chariot, un support ou une table inclinée ou instable, afin d'éviter que le moniteur ne tombe, occasionnant de sérieux dommages au moniteur.
- Maintenir le moniteur éloigné des transformateurs à haute capacité, des moteurs électriques et de tous autres dispositifs tels que des haut-parleurs ou ventilateurs externes, lesquels peuvent créer des champs magnétiques puissants.
- Si possible, positionner le moniteur de sorte qu'il soit orienté vers l'est, afin de minimiser les effets du champ magnétique terrestre.
- Changer l'orientation du moniteur alors que celui-ci est sous tension peut occasionner une décoloration de l'image. Pour éviter cela, mettre le moniteur hors tension pendant 20 minutes avant de le remettre sous tension.
- Pour l'utilisation du moniteur MultiSync FE700 avec l'alimentation CA mondiale de 220-240 V, utiliser un cordon d'alimentation qui correspond à la tension de l'alimentation fournie à la prise de courant CA. Le cordon d'alimentation utilisé doit être agréé et en conformité avec les normes de sécurité de son pays. (Type H05VV-F à utiliser sauf au Royaume-Uni.)
- Au Royaume-Uni, utiliser un cordon d'alimentation certifié BS avec une prise moulée ayant un fusible noir (SA) installé pour l'utilisation avec ce moniteur. Si un cordon d'alimentation n'est pas fourni avec ce moniteur, veuillez contacter votre fournisseur.

Débrancher immédiatement le moniteur de la prise murale et confier la réparation à du personnel technique qualifié dans les cas suivants :

- Lorsque le cordon d'alimentation ou la fiche est endommagé(e).
- Si du liquide a été renversé ou des objets sont tombés à l'intérieur du moniteur.
- Si le moniteur a été exposé à la pluie ou à de l'eau.
- Si le moniteur est tombé ou le boîtier est endommagé.
- Si le moniteur ne fonctionne pas normalement en suivant les directives d'utilisation.
 - Prévoir une aération suffisante autour du moniteur pour que la chaleur puisse se dissiper correctement. Ne pas obstruer les ouvertures de ventilation ni placer le moniteur près d'un radiateur ou autre source de chaleur. Ne rien poser sur le moniteur.
 - La fiche du cordon d'alimentation est le moyen principal de débrancher le système de l'alimentation. Le moniteur doit être installé à proximité d'une prise de courant facilement accessible.
 - Manipuler avec soin lors du transport. Conserver l'emballage pour le transport.



AVERTISSEMENT

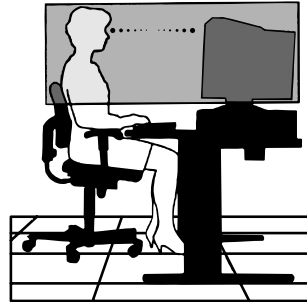
Usage recommandé (suite)



LA MODIFICATION DE LA POSITION ET DU RÉGLAGE DU MONITEUR
PEUT RÉDUIRE LA FATIGUE DES YEUX, DES ÉPAULES ET DE LA NUQUE.
OBSERVER LES DIRECTIVES CI-APRÈS LORS DU POSITIONNEMENT
DU MONITEUR :



- Régler la hauteur du moniteur de sorte que le dessus de l'écran soit au niveau ou légèrement en-dessous du niveau des yeux. Les yeux doivent regarder légèrement vers le bas lorsque l'on regarde le milieu de l'écran.
- Positionner le moniteur à une distance minimale de 40 cm (16 po) et maximale de 60 cm (24 po) des yeux. La distance optimale est de 50 cm (20 po).
- Reposer ses yeux régulièrement en regardant vers un objet situé à au moins 6 m (20 pieds). Cligner régulièrement.
- Positionner le moniteur à un angle de 90° par rapport aux fenêtres et autres sources de lumière, afin de réduire au maximum les reflets et l'éblouissement. Régler l'inclinaison du moniteur de sorte que l'éclairage du plafond ne soit pas reflété sur l'écran.
- Si une lumière réfléchie rend la vision de l'écran difficile, utiliser un filtre anti-reflet.
- Nettoyer régulièrement le moniteur. Utiliser un chiffon sans peluches et non abrasif et une solution de nettoyage sans alcool, neutre, non abrasive ou un produit nettoyant pour vitres pour éliminer au maximum la poussière.
- Régler les commandes de luminosité et de contraste du moniteur pour améliorer la lisibilité.
- Utiliser un support de document placé près de l'écran.
- Positionner ce que l'on regarde le plus souvent (l'écran ou les documents de référence) directement devant soi pour réduire au maximum les mouvements de la tête lorsque l'on dactylographie.
- Consulter régulièrement un ophtalmologiste.



Ergonomie

Pour optimiser les avantages ergonomiques, observez les directives suivantes :

- Régler la luminosité jusqu'à ce que la trame de fond disparaisse.
- Ne pas placer la commande de contraste à son réglage maximum.
- Utiliser les commandes de format et position préprogrammées avec signaux standard .
- Utiliser le réglage couleur et les commandes gauche/droite préprogrammés.
- Utiliser des signaux non entrelacés avec fréquence de rafraîchissement vertical de 75 à 120 Hz.
- Ne pas utiliser la couleur bleu primaire sur fond foncé car cela rend la lecture difficile et peut occasionner de la fatigue oculaire en raison de contraste insuffisant.

Pour des informations plus détaillées sur l'établissement d'un environnement de travail sain, appeler NEC au (800) 820-1230, demander le service d'information par télécopieur NEC FastFacts au (630) 467-4363 et demander le document n° 900108 ou écrire à American National Standard for Human Factors Engineering of Visual Display Terminal Workstations - ANSI-HFS Standard No. 100-1988 - The Human Factors Society, Inc. P.O. Box 1369, Santa Monica, California 90406.

Fiche technique

| Caractér. techniques du moniteur | | Moniteur MultiSync® FE700 ^{MC} | Remarques |
|---|--|---|--|
| Tube cathodique | Diagonale : Surface utile : Rayon : | 17 po 16 po 50 000 mm | Déflexion de 90°, grille de 0,25 mm, à grille d'ouverture, luminophore à persistance moyenne-courte, revêtement d'écran écran foncée, multicouche antistatique, et surface d'écran OptiClear®. |
| Signal d'entrée | Vidéo : Sync : | ANALOGIQUE 0,7 Vp-p/75 ohms Sync. séparée - niveau TTL Sync. horizontale positif/négatif Sync. verticale positif/négatif Sync. composite (positif/négatif) (niveau TTL) | |
| Couleurs d'affichage | Entrée analogique : | Nombre illimité de couleurs | Dépend de la carte vidéo utilisée. |
| Gamme de Synchronisation | Horizontale : Verticale : | 31 kHz à 70 kHz 55 Hz à 120 Hz | Automatique Automatique |
| Résolutions autorisées Résolutions basées sur les fréquences horizontales et verticales uniquement | | 640 x 480 @ 60 à 120 Hz 800 x 600 @ 55 à 110 Hz 832 x 624 @ 55 à 105 Hz 1024 x 768 @ 55 à 87 Hz 1152 x 870 @ 55 à 77 Hz 1280 x 1024 @ 55 à 66 Hz | Certains systèmes peuvent ne pas accepter tous les modes listés. NEC recommande une résolution à 85 Hz pour des performances d'affichage optimales. |
| Zone d'affichage active (réglages d'usine) | Horizontale : Verticale : | 315 mm/12,4 pouces 236 mm/9,3 pouces | Dépend de la synchronisation du signal utilisée et ne comprend pas la zone de bord. |
| Zone d'affichage active (balayage complet) | | 325 mm/12,8 pouces 246 mm/9,3 pouces | Dépend de la synchronisation du signal utilisée et ne comprend pas la zone de bord. |
| Alimentation | | CA 100-240 V, 50/60 Hz | |
| Tension d'alimentation | | 1,8 A @ 100-240 V | |
| Dimensions | | 403 mm (L) x 427 mm (H) x 424 mm (P) 15,9 pouces (L) x 16,8 pouces (H) x 16,7 pouces (P) | |
| Poids | | 19,0 kg 41,9 lbs | |
| Considérations environnementales | Température de fonctionnement : Humidité : Altitude : Température de stockage : Humidité : Altitude : | +10 °C à +35 °C / +50°F à +90°F 30 % à 80 % 0 à 10 000 pieds -20 °C à +60 °C / -4°F à +140°F 10 % à 90 % 0 à 45 000 pieds | |

REMARQUE : Les caractéristiques techniques sont sujettes à changement sans préavis

Fonctions

TRC à grille d'ouverture plate : Assure une qualité de visualisation inégalée avec une image quasi-plate, éliminant la distorsion et réduisant les reflets de sorte que ce que vous voyez à l'écran est identique à ce qui est imprimé sur papier. L'alignement liminophore strié sur TRC fournit une résolution verticale supérieure et une luminosité pour un contraste d'image plus uniforme.

Surface d'écran OptiClear® : Réduit la réflexion et l'éblouissement et augmente le contraste sans sacrifier le niveau de netteté, la clarté ni la luminosité. En plus de la technologie TRC d'écran plat carré, un écran à haut contraste avec un pas de grille de 0,25 mm procure des textes et des graphiques clairs et détaillés.

Mise au point à double faisceau dynamique : Permet des réglages précis et continus des faisceaux électroniques et une qualité d'image optimale, jusqu'à l'extrémité des bords de l'écran.

Système de commande AccuColor® : Permet de changer entre cinq la configuration de couleurs sur votre affichage pour apparier votre préférence personnelle.

Commandes OSM^{MC} (Gestionnaire à l'écran) : Permet de régler facilement et rapidement tous les éléments de l'image de l'écran via les menus à l'écran simples à utiliser.

Fonctions ErgoDesign® : Améliore l'ergonomie humaine pour améliorer l'environnement de travail, protéger la santé de l'utilisateur et épargner de l'argent. On peut citer comme exemple les commandes OSM pour un réglage rapide et facile de l'image, un socle inclinable et rotatif pour un meilleur confort de visualisation et la conformité aux directives MPRII concernant les réductions d'émissions.

Plug and Play : La solution Microsoft® avec le système d'exploitation Windows®95/98 facilite la configuration et l'installation en permettant au moniteur d'envoyer ses capacités (telles que le format et les résolutions d'écran acceptés) directement à l'ordinateur, optimisant ainsi automatiquement les performances d'affichage.

Système IPM^{MC} (Intelligent Power Manager/Gestionnaire d'énergie intelligent) : Procure des méthodes d'économie d'énergie novatrices qui permettent au moniteur de passer à un niveau de consommation d'énergie plus faible lorsqu'il est allumé mais non utilisé, épargnant deux tiers des coûts énergétiques, réduisant les émissions et diminuant les coûts de conditionnement d'air du lieu de travail.

Technologie Reduced Magnetic Field^{MC} (Champs magnétiques réduits) : Réduit les émissions de champs magnétiques et électriques alternatifs et l'électricité statique, dans un but de réduire les risques potentiels découlant d'une utilisation prolongée d'un moniteur d'ordinateur.

Technologie à fréquence multiple : Règle automatiquement le moniteur à la fréquence de la carte vidéo, affichant ainsi la résolution requise.

Capacité FullScan^{MC} (Balayage complet) : Permet d'utiliser la totalité de la surface d'écran dans la plupart des résolutions, augmentant ainsi de façon significative la taille de l'image.

OSM Display Screen Copyright 1999 par NEC Technologies, Inc.

Dépannage

Pas d'image

- La carte vidéo doit être complètement introduite dans son logement.
- La touche d'alimentation et le commutateur d'alimentation de l'ordinateur doivent être en position ON (Marche).
- Le câble d'interface doit être bien connecté à la carte vidéo/l'ordinateur.
- Vérifier si les broches du connecteur ne sont pas pliées ou renfoncées.

L'image défile ou est instable

- Le câble d'interface doit être bien fixé à l'ordinateur.
- Contrôler la répartition des broches et la synchronisation de signal du moniteur et la carte vidéo en respectant les synchronisations et la répartition des broches recommandées.
- Si l'adaptateur de câble Macintosh est utilisé, vérifier la connexion au préalable ou s'assurer si la carte vidéo est compatible Macintosh et si la carte est bien mise en place dans l'ordinateur.

La DEL sur le moniteur n'est pas allumée (*aucune couleur, verte, orange ou jaune, n'est visible*)

- Le commutateur d'alimentation doit être en position ON et le cordon d'alimentation doit être connecté.

L'image est floue ou les couleurs semblent brouillées

- Régler les commandes de luminosité et de contraste.
- Accéder à la commande Degauss via les commandes OSM^{MC}. Activer la commande Degauss.

ATTENTION : Un intervalle d'au moins 20 minutes doit s'écouler avant que la commande Degauss ne soit utilisée une seconde fois lorsqu'il n'y a pas de commutation entre les modes.

L'image danse ou une trame onduleuse est présente sur l'image

- Éloigner du moniteur les appareils électriques qui peuvent occasionner des interférences électriques.
- Voir à l'intérieur de la couverture du guide pour les informations FCC.

Les bords de l'image affichée ne sont pas carrés

- Utiliser les commandes de géométrie OSM pour redresser les bords.
- Si possible, orienter l'avant du moniteur vers l'est.

L'image affichée n'est pas centrée, est trop petite ou trop large

- Utiliser les commandes de format et de positionnement OSM pour ajuster l'image.

Fines lignes apparaissent à l'écran

- Les lignes que vous apercevez sur votre écran sont une caractéristique normale de aperture grille CRT et ne constitue donc pas un dysfonctionnement. Il s'agit de l'ombre des fils d'amortissement employés pour stabiliser la grille d'ouverture qui sont le plus facilement visibles lorsque l'arrière-plan de l'écran est clair (généralement blanc).

Références

- **BBS (978) 742-8706**

Le système de babillard électronique NEC Technologies est un service électronique accessible avec votre système et un modem. Les paramètres de communication sont : 300/1200/2400/9600/1,4 k/28,8 k bps, pas de parité, 8 bits de données, 1 bit d'arrêt

- **Service à la clientèle/**
Assistance technique (800) 632-4662
Télécopieur (978) 742-7049

- **Canaux électroniques :**

Courrier électronique
 Internet (e-mail) : tech-support@nectech.com
 Site internet ftp : <ftp.nectech.com>
 World Wide Web : <http://www.nectech.com>
 Produit enregistré : <http://www.nectech.com/productregistration>
 Fichier INF Windows® 95/98 : <http://cssweb.nectech.com/common/drivers.htm>
 Ensuite, télécharger le fichier NECMSINF.ZIP

- **Informations FastFacts^{MC} (630) 467-4363**

| INFORMATION | DESCRIPTION | N° DOCUMENT |
|-------------------------------|--|-------------|
| Glossaire | Définition des termes en relation avec les fonctions, les caractéristiques et l'installation du moniteur MultiSync | 900203 |
| Informations complémentaires | Noms et adresses d'autres groupes impliqués dans les normes et les fonctions du moniteur MultiSync | 900204 |
| Connexion Macintosh | Informations détaillées sur le raccordement du moniteur MultiSync à un Macintosh | 153006 |
| Environnement de travail sain | Informations détaillées sur l'établissement d'un environnement de travail sain | 900108 |

- **Info docum. & vente (800) NEC-INFO [(800) 632-4636]**

- **Commande de produits MultiSync (800) 820-1230**
 [Pour logiciels et accessoires]

- **Téléventes (800) 284-4484**

Garantie limitée

NEC Technologies, Inc. (ci-après «NECTECH») garantit que ce produit est exempt de vice de fabrication et de main-d'oeuvre et, selon les conditions énoncées ci-dessous, accepte de réparer ou remplacer, à sa discrétion, toute pièce de l'appareil concerné qui s'avérerait défectueuse et ce, pendant une période de trois (3) ans à partir de la date d'achat initial. Les pièces de rechange sont garanties pendant quatre-vingt dix (90) jours. Les pièces de rechange ou unités peuvent être neuves ou reconditionnées et seront conformes aux spécifications des pièces et des unités d'origine.

Cette garantie vous accorde des droits légaux spécifiques auxquels peuvent s'ajouter d'autres droits pouvant varier d'une juridiction à l'autre. Cette garantie est limitée à l'acheteur d'origine du produit et n'est pas transférable. Cette garantie couvre uniquement les composants fournis par NECTECH. Une réparation requise à la suite de l'utilisation des pièces provenant d'un tiers n'est pas couverte par cette garantie. Pour être couvert par cette garantie, le produit doit avoir été acheté aux États-Unis ou au Canada par l'acheteur d'origine. Cette garantie couvre uniquement la distribution du produit aux États-Unis ou au Canada par NECTECH. Aucune garantie n'est offerte à l'extérieur des États-Unis et du Canada. La preuve d'achat sera exigée par NECTECH pour prouver la date d'achat. Une telle preuve d'achat doit être une facture de vente d'origine ou un reçu reprenant le nom et l'adresse du vendeur, de l'acheteur et le numéro de série du produit.

Pour obtenir un service au titre de la garantie, vous devez expédier le produit en port prépayé ou le déposer chez le revendeur agréé qui vous l'a vendu ou dans un autre centre autorisé par NECTECH, soit dans l'emballage d'origine, soit dans un emballage similaire procurant un niveau équivalent de protection. Avant de retourner tout produit à NECTECH, vous devez d'abord obtenir une autorisation de retour de marchandise en composant le 1-800-632-4662.

Le produit ne pourra avoir été enlevé ou modifié, réparé ou entretenu au préalable par personne d'autre que du personnel technique autorisé par NECTECH, et le numéro de série du produit ne pourra pas avoir été enlevé. Pour être couvert par cette garantie, le produit ne pourra pas avoir été soumis à l'affichage d'une image fixe pendant de longues périodes de temps résultant en une persistance de l'image, un accident, une utilisation incorrecte ou abusive ou une utilisation contraire aux directives contenues dans le guide de l'utilisateur. Une seule de ces conditions annulera la garantie.

NECTECH NE POURRA ÊTRE TENUE RESPONSABLE DE DOMMAGES DIRECTS, INDIRECTS, ACCIDENTELS, SECONDAIRES OU D'AUTRES TYPES DE DOMMAGES RÉSULTANT DE L'UTILISATION D'UN PRODUIT QUI N'ENTRENT PAS SOUS LA RESPONSABILITÉ DÉCRITE CI-DESSUS. CES GARANTIES REMPLACENT TOUTE AUTRE GARANTIE EXPLICITE OU IMPLICITE, Y COMPRIS, MAIS SANS S'Y LIMITER, TOUTE GARANTIE DE QUALITÉ MARCHANDE OU D'APTITUDE À UNE FIN PARTICULIÈRE. CERTAINES JURIDICTIONS NE PERMETTANT PAS L'EXCLUSION DE GARANTIES IMPLICITES OU LA LIMITATION OU L'EXCLUSION DE RESPONSABILITÉ POUR DOMMAGES ACCIDENTELS OU SECONDAIRES, LES EXCLUSIONS OU LIMITATIONS CI-DESSUS POURRAIENT NE PAS S'APPLIQUER DANS VOTRE CAS.

Ce produit est garanti selon les termes de cette garantie limitée. Les consommateurs doivent savoir que les performances du produit peuvent varier selon la configuration du système, le logiciel, l'application, les données du client et la manière dont le produit est utilisé par l'opérateur, ainsi que d'autres facteurs. Bien que les produits NECTECH soient considérés compatibles avec de nombreux systèmes, la mise en oeuvre fonctionnelle du produit peut varier d'un client à l'autre. Par conséquent, l'adéquation d'un produit à un besoin ou une application spécifique doit être déterminée par le consommateur et n'est pas garantie par NECTECH.

Pour connaître le nom du centre de service technique agréé NECTECH le plus proche, appeler NECTECH au 1-800-632-4662.

TCO'99

Félicitations! Vous avez acheté un produit qui répond à la directive TCO'99. En choisissant ce produit conçu pour une utilisation professionnelle, vous contribuez aussi à la réduction des effets nuisibles sur l'environnement et aussi au développement continu de produits électroniques respectueux de l'environnement.



Pourquoi des ordinateurs «éco-étiquetés»?

Dans de nombreux pays, l'éco-étiquetage est devenu une méthode reconnue pour favoriser la mise au point de biens et de services respectueux de l'environnement. Pour ce qui est des ordinateurs et autre équipement électronique, le problème est double : des substances nuisibles à l'environnement sont utilisées à la fois dans le produit et au cours du processus de fabrication. Comme il n'a pas été possible de recycler de manière appropriée la majeure partie de l'équipement électronique, ces substances sont tôt ou tard introduites dans la nature.

L'ordinateur comporte d'autres caractéristiques comme les niveaux de consommation énergétique, qui influent à la fois sur l'environnement de travail (interne) et sur l'environnement naturel (externe). Étant donné que toutes les méthodes de génération d'électricité traditionnelle ont un impact négatif sur l'environnement (retombées acides et émissions provoquant des changements climatiques, déchets radioactifs, etc.), la conservation de l'énergie est cruciale. Les appareils électroniques utilisés dans des bureaux consomment une quantité énorme d'énergie puisqu'ils sont souvent laissés continuellement en marche.

Qu'est-ce qu'implique l'éco-étiquetage?

Ce produit répond aux exigences de la directive TCO'99 qui prévoit l'éco-étiquetage et étiquetage international d'ordinateurs personnels. La directive d'étiquetage a été élaborée par le TCO (Confédération suédoise des employés professionnels), Svenska Naturskyddsforeningen (Société suédoise de conservation de la nature) et Statens Energimyndighet (Administration nationale de l'énergie de la Suède).

La directive couvre plusieurs volets : environnement, ergonomie, facilité d'utilisation, émissions de champs électriques et magnétiques, consommation énergétique, sécurité-électrique et sécurité-incendie.

Les exigences environnementales concernent la restriction de la présence et de l'utilisation, entre autres, de métaux lourds, de retardateurs de flamme contenant du brome et du chlore, d'hydrocarbure chlorofluoré (fréon) et de solvants chlorés. Le produit doit être préparé en vue d'être éventuellement recyclé et le fabricant est tenu d'élaborer un plan environnemental qui doit être respecté dans chaque pays où la société met en œuvre sa politique opérationnelle. Dans le cadre des exigences relatives à la consommation, l'ordinateur et/ou l'écran doit, après une certaine période d'inactivité, réduire sa consommation énergétique en une ou plusieurs phases. Le temps nécessaire à la réactivation de l'ordinateur devra être raisonnable. Les produits étiquetés doivent répondre à des exigences environnementales rigoureuses, par exemple, eu égard à la réduction des champs électriques et magnétiques, à l'ergonomie physique et visuelle et à la facilité d'utilisation.

Exigences environnementales

Retardateurs de flamme

Les retardateurs de flamme sont présents dans les cartes à circuits imprimés, les câbles, les fils, les châssis et les boîtiers. Leur présence permet de retarder la propagation du feu. Le plastique d'un boîtier d'ordinateur peut contenir jusqu'à trente pour cent de substances ignifuges. La plupart des retardateurs de flamme contiennent du brome ou du chlore et ces derniers s'apparentent à un autre groupe de toxines environnementales, les PCB, qui sont suspectés de provoquer des effets néfastes pour la santé, dont la modification de la reproduction chez les oiseaux piscivores et les mammifères, attribuable aux processus biocumulatifs*. La présence de retardateurs de flamme a été détectée dans le sang humain et les chercheurs craignent que le développement du fœtus pourrait être perturbé. La directive TCO'99 exige que les composants en plastique pesant plus de

TCO'99 (suite)

25 grammes ne contiennent pas de retardateurs de flamme contenant du chlore ou du brome organiquement liés. Les retardateurs de flamme sont autorisés dans les cartes à circuits imprimés étant donné qu'aucun substitut n'est encore disponible.

Plomb**

Le plomb peut être présent dans les tubes cathodiques, les écrans, les soudures et les condensateurs. Le plomb s'attaque au système nerveux et, à doses élevées, entraîne l'intoxication par le plomb.

La directive TCO'99 permet l'inclusion du plomb étant donné qu'aucun remplacement n'a encore été mis au point.

Cadmium**

Le cadmium est présent dans les batteries rechargeables et dans les couches de génération des couleurs de certains écrans d'ordinateur. Le cadmium s'attaque au système nerveux et est toxique à doses élevées.

La directive TCO'99 stipule que les batteries, les couches de génération de couleurs d'écrans d'ordinateur et les composants électriques ou électroniques ne doivent pas contenir de cadmium.

Mercure**

Le mercure est parfois présent dans les batteries, les relais, les interrupteurs et les systèmes rétroéclairés. Le cadmium s'attaque au système nerveux et est toxique à doses élevées.

La directive TCO'99 stipule que les batteries ne peuvent de mercure. Elle exige aussi que le mercure soit absent de tous les composants électriques ou électroniques associés à l'écran.

Hydrocarbures chlorofluorés (fréon)

Les hydrocarbures chlorofluorés (fréon) sont parfois utilisés dans le lavage des cartes à circuits imprimés. Les hydrocarbures chlorofluorés décomposent la couche d'ozone et endommagent la couche l'ozone dans la stratosphère, ce qui provoque l'augmentation de rayonnement ultraviolet sur la terre et entraîne le risque accru de cancer de la peau (mélanome malin).

La directive TCO'99 : les hydrocarbures chlorofluorés et les hydrocarbures partiellement halogénés ne peuvent pas être utilisés dans la fabrication ou l'assemblage du produit ou de son emballage.

*Biocumulatif signifie les substances qui s'accumulent au sein d'organismes vivants.

**Le plomb, le cadmium et le mercure sont des métaux lourds qui sont biocumulatifs.

Pour obtenir des informations détaillées sur le document des critères environnementaux, adressez-vous à:

TCO Development Unit

SE 114 94 Stockholm

SUÈDE

Numéro de télécopieur : +46 8 782 92 07

Courriel (Internet) : development@tco.se

Vous pouvez aussi obtenir des informations à jour sur les produits approuvés et étiquetés TCO'99 en visitant le site Web <http://www.tco-info.com>

Déclaration du fabricant

Nous certifions par la présente que
les moniteurs MultiSync® FE700^{MC}
(N9705) sont conformes à
la directive 73/23/EEC du Conseil :
– EN 60950
la directive 89/336/EEC du Conseil :
– EN 55022
– EN 60555-2
– EN 61000-3-3
– EN 50082-1
(IEC-801-2)
(IEC-801-3)
(IEC-801-4)

et porte le sigle



NEC Home Electronics, LTD.
686-1, NISHIOI OI-MACHI,
ASHIGARAKAMI-GUN
KANAGAWA 258-8533, JAPAN

Röntgenstrahlung

Die in diesem Gerät erzeugten Röntgenstrahlen sind durch die eigensichere Kathodenstrahlröhre ausreichend abgeschirmt.

Unsachgemäße Eingriffe, insbesondere Verändern der Hochspannung oder Einbau eines anderen Bildröhrentyps, können dazu führen, daß Röntgenstrahlung in erheblicher Stärke auftritt. So veränderte Geräte entsprechen nicht mehr dieser Zulassung und dürfen nicht betrieben werden.

Série Flat Enterprise NEC

AVIS DE PROPRIÉTÉ EXCLUSIVE ET DE DÉGAGEMENT DE RESPONSABILITÉ

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Les produits de NEC Technologies dont il est question dans ce document sont garantis conformément aux termes de la déclaration de garantie limitée accompagnant chaque produit. Cependant, les performances réelles de chaque produit dépendent de facteurs tels que la configuration du système, les données du client et la manière dont le produit est utilisé. Étant donné que la mise en œuvre fonctionnelle du produit peut varier d'un client à l'autre, l'adéquation et l'application de configurations spécifiques du produit peuvent être déterminées par le client et ne sont pas garanties par NEC Technologies.

Afin de permettre l'amélioration du design et des caractéristiques techniques, les informations contenues dans ce document sont sujettes à modifications sans préavis. La reproduction totale ou partielle de ce document sans l'accord préalable de NEC Technologies est interdite.

DÉCLARATION DE CONFORMITÉ

Cet appareil est conforme à l'article 15 du règlement de la FCC. L'utilisation est soumise à deux conditions. 1) Cet appareil ne peut pas occasionner d'interférences nuisibles, et 2) cet appareil doit accepter toutes interférences reçues, y compris les interférences qui peuvent occasionner un mauvais fonctionnement.

| | |
|--|---------------------------------------|
| Partie responsable américaine : | NEC Technologies, Inc. |
| Adresse : | 1250 N. Arlington Heights Road |
| | Itasca, Illinois 60143 |
| N° tél. : | (630) 467-5000 |

| | |
|--------------------------------|-----------------------|
| Type de produit : | Moniteur d'ordinateur |
| Classification de l'appareil : | Périphérique classe B |
| Modèles : | N9705 |



Nous déclarons par la présente que les appareils mentionnés ci-dessus sont conformes aux normes techniques spécifiées dans le règlement de la FCC.

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WARNUNG



UM BRÄNDE BZW. ELEKTRISCHE SCHLÄGE ZU VERMEIDEN, SETZEN SIE DIESES GERÄT WEDER REGEN NOCH SONSTIGER FEUCHTIGKEIT AUS. VERWENDEN SIE DEN GEPOLTEN STECKER DIESES GERÄTS NICHT MIT EINER VERLÄNGERUNGSSTECKDOSE ODER ANDEREN STECKDOSEN, WENN DIE POLE NICHT ZUR GÄNZE IN DIESE EINGEFÜHRT WERDEN KÖNNEN. ÖFFNEN SIE DAS GERÄT NICHT SELBST, DA ES UNTER HOHER SPANNUNG STEHENDE KOMPONENTEN ENTHÄLT. ÜBERLASSEN SIE WARTUNGSARBEITEN QUALIFIZIERTEN SERVICE TECHNIKERN.



VORSICHT



GEFAHR VON ELEKTRISCHEN SCHLÄGEN • NICHT ÖFFNEN

VORSICHT: UM DIE GEFAHR EINES ELEKTRISCHEN SCHLAGS ZU VERRINGERN, ENTFERNEN SIE DIE ABDECKUNG (BZW. DIE RÜCKWAND) NICHT. IM INNEREN DES GERÄTS BEFINDEN SICH KEINE TEILE, DIE VOM BENUTZER SELBST GEWARTET WERDEN KÖNNEN. ÜBERLASSEN SIE WARTUNGSARBEITEN QUALIFIZIERTEN SERVICE TECHNIKERN.



Dieses Symbol macht den Benutzer darauf aufmerksam, daß nicht isolierte Spannungen im Inneren des Geräts stark genug sein können, um einen elektrischen Schlag hervorzurufen. Aus diesem Grund ist das Berühren jeglicher Komponente im Inneren dieses Geräts gefährlich.



Dieses Symbol macht den Benutzer darauf aufmerksam, daß wichtige Literatur zur Bedienung und Wartung dieses Geräts mitgeliefert wurde. Diese Unterlagen sollten sorgfältig gelesen werden, um jegliche Probleme zu vermeiden.

Konformitätsbestätigung des kanadischen Department of Communications

DOC : Dieses digitale Gerät der Klasse B entspricht allen Anforderungen der kanadischen Bestimmungen in bezug auf Interferenzen verursachende Geräte.

C-UL : Trägt das C-UL-Zeichen und entspricht den kanadischen Sicherheitsbestimmungen gemäß C.S.A. 22.2 # 950.

Informationen der FCC (Federal Communications Commission)

1. Verwenden Sie mit den Farbmonitoren N9705 die angeschlossenen und genannten Kabel, um keinerlei Interferenzen mit Radio- und Fernsehempfang zu verursachen.

(1) Verwenden Sie bitte das mitgelieferte Netzkabel bzw. ein äquivalentes Kabel, um die FCC-Konformität sicherzustellen.

(2) Geschirmtes Videosignalkabel.

Die Verwendung anderer Kabel und Adapter kann Interferenzen mit Radio- und Fernsehempfang verursachen.

2. Dieses Gerät wurde geprüft und gemäß Teil 15 der Regeln der FCC für mit den Grenzwerten für ein digitales Gerät der Klasse B konform befunden. Diese Grenzwerte sollen angemessen vor Interferenzen schützen, die von im Wohnbereich installierten Geräten ausgehen. Dieses Gerät erzeugt und verwendet Radiofrequenzenergie und kann diese auch ausstrahlen. Wenn es nicht in Übereinstimmung mit der Gebrauchsanweisung installiert und betrieben wird, kann es Interferenzen hervorrufen, die Funkverbindungen beeinträchtigen. Allerdings besteht keine Garantie dafür, daß Interferenzen bei einer bestimmten Anlage nicht auftreten werden.

Wenn dieses Gerät den Radio- oder Fernsehempfang beeinträchtigende Interferenzen verursacht (dies kann durch An- und Abschalten des Geräts festgestellt werden), sollte der Benutzer versuchen, die Interferenzen durch eine oder mehrere der folgenden Maßnahmen zu beseitigen:

- Richten Sie die Empfangsantenne neu aus bzw. stellen Sie sie an einem anderen Ort auf.
- Vergrößern Sie den Abstand zwischen dem Gerät und dem Empfänger.
- Stecken Sie das Gerät an eine Steckdose an, die sich in einem anderen Stromkreis befindet als die Steckdose, an die der Empfänger angeschlossen ist.
- Wenden Sie sich an Ihren Händler oder an einen erfahrenen Radio- / TV-Techniker.

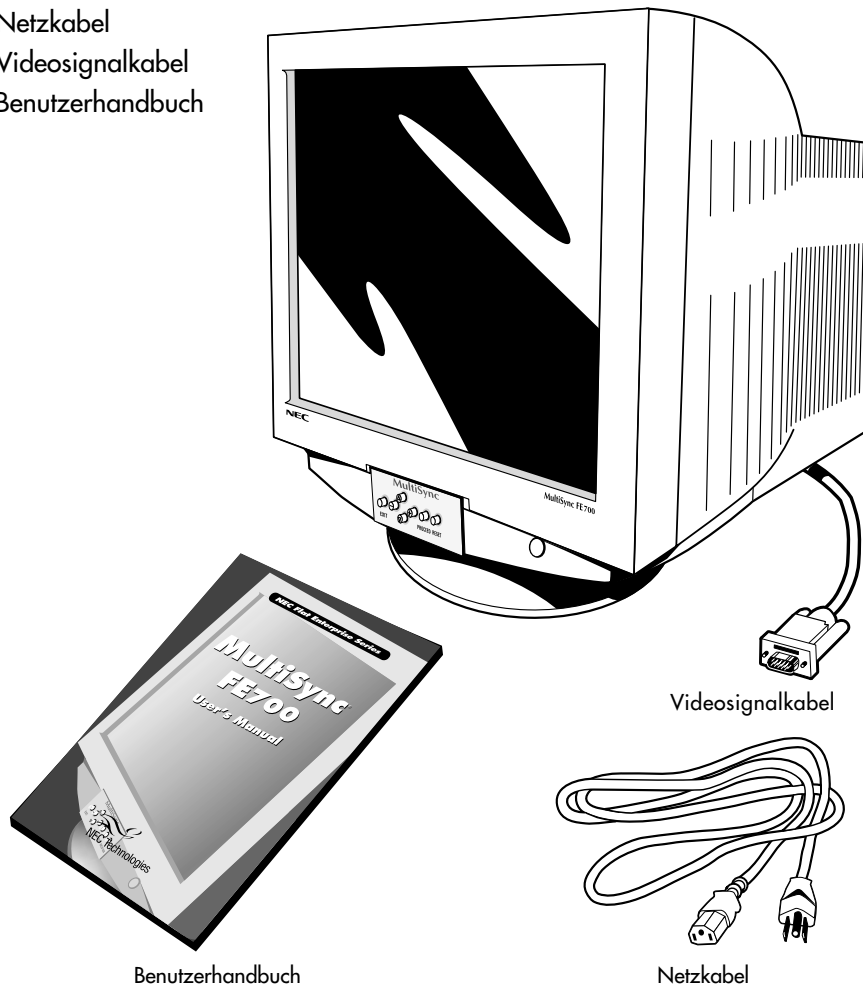
Falls erforderlich sollte der Benutzer sich an den Händler oder an einen erfahrenen Radio- / TV-Techniker wenden, um zusätzliche Empfehlungen zu erhalten. Auch die von der Federal Communications Commission herausgegebene Broschüre „How to Identify and Resolve Radio-TV Interference Problems“ kann sich für den Benutzer unter Umständen als nützlich erweisen. Diese Broschüre ist beim U.S. Government Printing Office, Washington, D.C., 20402, unter Bestellnummer 004-000-00345-4 erhältlich.

Lieferumfang

Sie können Ihr Gerät auch im Internet unter der Adresse <http://www.nectech.com/productregistration>

Ihr neues MultiSync® FE700™ Monitor-Paket* von NEC Technologies sollte den nachfolgenden Inhalt umfassen:

- MultiSync FE700 Monitor mit Schwenk-/Neigefuß
- Netzkabel
- Videosignalkabel
- Benutzerhandbuch



* Denken Sie daran, die Originalverpackung und das Verpackungsmaterial für einen späteren Transport bzw. eine Versendung Ihres Monitors aufzubewahren.

Quick Start

Um den MultiSync® FE700™ Monitor an Ihr System anzuschließen, führen Sie bitte die folgenden Schritte aus:

1. Den Computer ausschalten.
2. Falls erforderlich installieren Sie die Grafikkarte in Ihrem System. Nähere diesbezügliche Informationen entnehmen Sie bitte dem Handbuch zu Ihrer Grafikkarte.
3. Beim PC: Schließen Sie den 15-poligen Mini-D-SUB-Stecker des Videosignalkabels an die Buchse der Grafikkarte Ihres Rechners (**Abbildung A.1**) an. Ziehen Sie alle Schrauben fest.

Beim Mac: Stecken Sie den MultiSync FE700 Macintosh-Kabeladapter (nicht im Lieferumfang enthalten) in die Monitorbuchse des Macintosh (**Abbildung B.1**). Schließen Sie den 15-poligen Mini-D-SUB-Stecker des Videosignalkabels an den an Ihrem Computer angesteckten Macintosh-Kabeladapter an (**Abbildung B.1**). Ziehen Sie alle Schrauben fest.

HINWEIS: Den MultiSync FE700 Macintosh-Kabeladapter können Sie bei NEC Technologies unter der Telefonnummer (800) 820-1230 bestellen.

4. Download-Informationen über die Windows® 95/98 INF-Datei für Ihren MultiSync Monitor finden Sie in diesem Benutzerhandbuch unter dem Abschnitt **Verweise**.
5. Schließen Sie ein Ende des Netzkabels an den MultiSync FE700 Monitor an und stecken Sie das andere Ende in die Steckdose (**Abbildung C.1**).
6. Schalten Sie den Monitor (**Abbildung D.1**) und den Computer ein.

HINWEIS: Beim Auftreten von Problemen lesen Sie bitte im Abschnitt **Fehlerbehebung** dieses Benutzerhandbuchs nach.

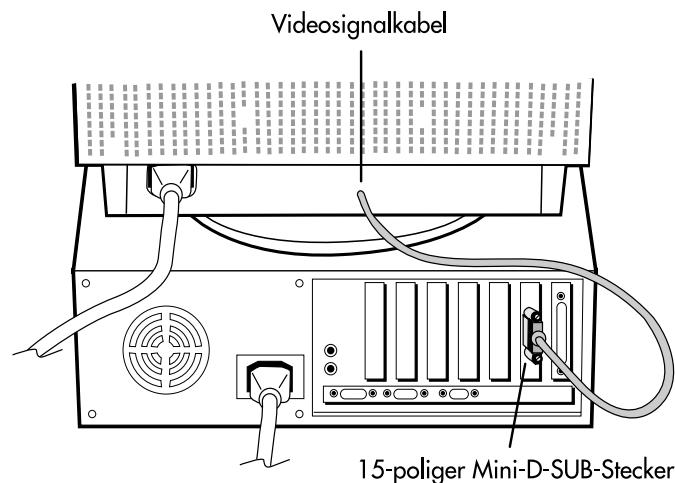


Abbildung A.1

Quick Start / Fortsetzung

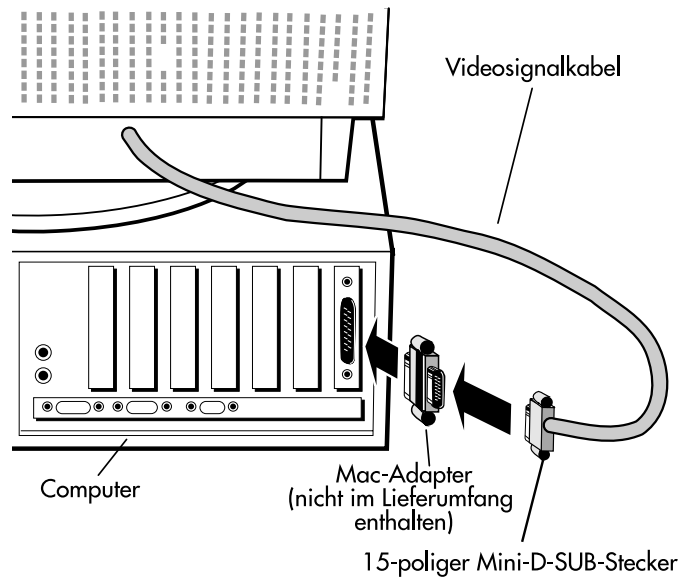


Abbildung B.1

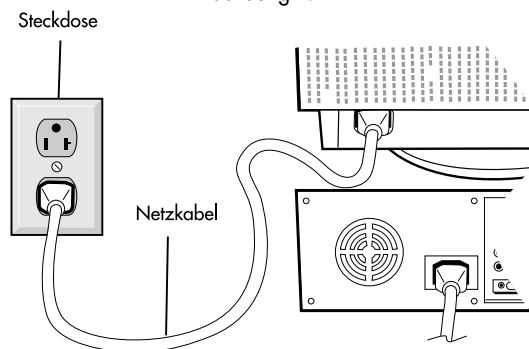


Abbildung C.1

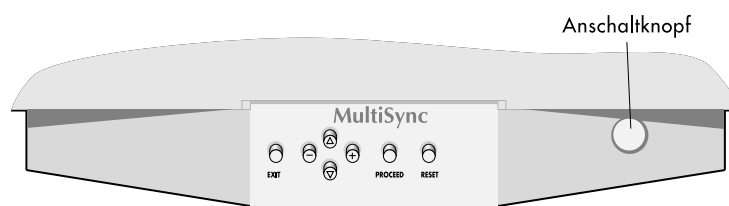



Abbildung D.1

Bedienungselemente

Mit den vorne am Monitor befindlichen OSM™- (On-Screen Manager)-Tasten werden die folgenden Funktionen ausgeführt:

| | Hauptmenü | Untermenü |
|---|--|---|
| EXIT | Beendet das OSM-Menü. | Führt zum OSM-Hauptmenü zurück. |
| CONTROL  | Verschiebt den hervorgehobenen Bereich nach oben/unten, um einen Menüpunkt auszuwählen. | Verschiebt den hervorgehobenen Bereich nach oben/unten, um einen Menüpunkt auszuwählen. |
| CONTROL -/+ | Verschiebt den hervorgehobenen Bereich nach rechts/links, um einen Menüpunkt auszuwählen. | Verschiebt den Balken in Richtung – oder +, um die Einstellung zu erhöhen oder zu verringern. |
| PROCEED | Diese Taste hat keine Funktion. | Führt nur die gewählte Einstellung aus oder führt weiter in ein Unter-Untermenü. |
| RESET | Setzt alle Einstellungen des hervorgehobenen Steuermenüs auf die Werkseinstellung zurück. | Setzt die hervorgehobene Einstellung auf die Werkseinstellung zurück. |
| HINWEIS: | Wird die RESET-Taste im Haupt- oder Untermenü gedrückt, so erscheint ein Warnfenster, das Ihnen ein Abbrechen der RESET -Funktion ermöglicht. | |

Wenn OSM-Funktionen aktiviert werden, werden im oberen Bereich des Menüs Symbole eingeblendet. Wenn in einem Untermenü ein Pfeil (➔) eingeblendet wird, so weist dies darauf hin, daß weitere Optionen zur Verfügung stehen. Um in ein Unter-Untermenü zu gelangen, drücken Sie die Taste PROCEED.

Helligkeits-/Kontrastregler

Helligkeit: Zur Einstellung der Helligkeit des Gesamtbildes und des Bildschirmhintergrundes.

Kontrast: Zur Einstellung der Bildhelligkeit in Vergleich zum Hintergrund.

Entmagnetisierung: Verhindert die Bildung von magnetischen Streufeldern, die die korrekte Abtastung der Elektronenstrahlen beeinträchtigen und die Reinheit der Bildschirmfarben, die Bildschärfe und die Konvergenz verändern. Wenn Sie diese Funktion aktivieren, wird Ihr Bild auf dem Bildschirm etwas schwanken und zucken, während der Bildschirm entmagnetisiert wird.

Achtung: Bitte verwenden Sie die Degauss-Funktion nur in Intervallen von mindestens 20 Minuten.

Größen- und Positionsregler

Links/Rechts: Verschiebt das Bild horizontal (nach links oder nach rechts).

Unten/Oben: Verschiebt das Bild vertikal (nach oben oder nach unten).

Schmal/Breit: Vergrößert oder verkleinert die horizontale Größe des Bildes.

Klein/Gross: Vergrößert oder verkleinert die vertikale Größe des Bildes.

Bedienungselemente / Fortsetzung

Color Control / AccuColor® Control System

Die Farbvoreinstellungen 1 bis 5 dienen zur Auswahl der gewünschten Farbeinstellung. Der Balken wird durch die ausgewählte Farbeinstellung von 1 bis 5 ersetzt. Jede Farbeinstellung wird im Werk an die angegebene Kelvin-Zahl angepaßt. Wenn eine Einstellung modifiziert wird, ändert sich der Name der Einstellung von Kelvin in den vom Benutzer für die Einstellung vorgegebenen Namen.

Rot, Grün, Blau: NECs AccuColor Control System erhöht oder verringert - in Abhängigkeit von der getroffenen Auswahl - entweder den roten, den grünen oder den blauen Farbanteil des Monitors. Die Farbänderung erscheint auf dem Bildschirm, und die Richtung (Erhöhung oder Verringerung) wird durch die Balken angezeigt.

Geometrie-Einstellungen

Die **Geometry**-Einstellungen erlauben Ihnen eine Anpassung der Krümmung oder der Winkel der Seiten Ihrer Bildschirmanzeige.

Ein/Aus (Kissenform): Vergrößert oder verkleinert die Krümmung der Seiten entweder nach innen oder nach außen.

Links/Rechts (Kissenformausgleich): Vergrößert oder verkleinert die Krümmung der Seiten entweder nach rechts oder nach links.

Parallel (Parallelogramm): Vergrößert oder verkleinert die Neigung der Seiten entweder nach links oder nach rechts.

Trapez (Trapezform): Vergrößert oder verkleinert den unteren Rand des Bildschirms auf die Größe des oberen Randes.

Drehen (Rasterdrehung): Dreht die gesamte Anzeige im Uhrzeigersinn oder gegen den Uhrzeigersinn.



Werkzeuge 1

Moirereduzierung: Moiré ist ein welliges Muster, das manchmal auf dem Bildschirm erscheint. Das Muster wiederholt sich und ist als schlangenhaftes Bild eingeblendet. Beim Fahren von gewissen Anwendungen ist das wellige Muster ausgeprägter als bei anderen. Um Moiré zu verringern verstellen Sie mit Hilfe der -/+ CONTROL-Tasten das ON/Level.

Werkseinstellung: Wenn Sie die Einstellung Factory Preset auswählen, können Sie die meisten OSM™-Einstellungen auf die Werkseinstellungen zurücksetzen. Es wird eine Warnung eingeblendet, in der Sie dazu aufgefordert werden, zu bestätigen, daß Sie ALLE Einstellungen zurücksetzen wollen. Einzelne Einstellungen können durch Hervorheben der Einstellung, die Sie zurücksetzen wollen, und anschließende Betätigung der **RESET**-Taste zurückgesetzt werden.



Werkzeuge 2

Sprachauswahl: Die OSM-Menüs stehen in sieben verschiedenen Sprachen zur Verfügung.

OSM Anzeigedauer: Das OSM-Menü wird solange angezeigt, wie es verwendet wird. Im Untermenü OSM Turn Off können Sie auswählen, wie lange der Monitor nach der letzten Betätigung einer Taste warten soll, bevor er das OSM-Menü ausblendet. Die zur Auswahl stehenden Voreinstellungen sind 10, 20, 30, 60 und 120 Sekunden.

Bedienungselemente / Fortsetzung

OSM Abschaltung: Diese Funktion verhindert den Zugriff auf alle OSM-Funktionen mit Ausnahme von Brightness und Contrast zur Gänze. Wenn Sie versuchen, OSM-Funktionen zu aktivieren, während sich das Gerät im Lock Out-Modus befindet, wird ein Bildschirm eingeblendet, der Sie darauf hinweist, daß der Zugriff auf die OSM-Funktionen gesperrt ist. Um die Funktion OSM Lock Out zu aktivieren, drücken Sie **PROCEED**, dann drücken Sie **▲** und halten Sie beide Tasten gleichzeitig niedergedrückt. Um die Funktion OSM Lock Out zu deaktivieren, drücken Sie **PROCEED**, dann drücken Sie **▲** und halten Sie beide Tasten gleichzeitig niedergedrückt.

IPM: Aktiviert: Das IPM System funktioniert normal, und alle Energiesparstufen werden genutzt.

 Deaktiviert: Der Off-Modus des IPM Systems wird nicht verwendet.

HINWEIS: für Standardsysteme und -grafikkarten behalten Sie die Werkseinstellung ENABLE bei.

Ergonomiehinweis: Eine Meldung wird Sie darauf hinweisen, wenn die Bildauffrischrate des vom Computer auf den Monitor angewandten Signals zu gering ist. Nähere diesbezügliche Informationen entnehmen Sie bitte dem Handbuch zu Ihrer Grafikkarte oder zu Ihrem Computer.



Information

Grafik Modus: Gibt den gegenwärtigen Modus und die Frequenzeinstellung des Monitors an.

Monitor Information: Gibt Auskunft über das Modell und die Seriennummern Ihres Monitors.

Empfehlungen für die Verwendung

Vorsichtsmaßnahmen und Wartung



UM DIE OPTIMALE LEISTUNGSFÄHIGKEIT IHRES MULTISYNC® FE700™ MONITOR ZU GEWÄHRLEISTEN, SOLLTEN SIE BEI DER AUFSTELLUNG UND VERWENDUNG IHRES GERÄTES DIE FOLGENDEN PUNKTE BEACHTEN



- **ÖFFNEN SIE DEN MONITOR NICHT.** Im Inneren des Gerätes befinden sich keine Teile, die vom Benutzer selbst gewartet werden können. Das Öffnen oder Entfernen der Abdeckungen könnte einen elektrischen Schock verursachen oder zu anderen gefährlichen Situationen führen. Wartungs- und Reparaturarbeiten dürfen nur von qualifizierten Service-Technikern ausgeführt werden.
- Vermeiden Sie das Eindringen von Flüssigkeiten in das Gerät und benutzen Sie den Monitor niemals in der Nähe von Wasser.
- Stecken Sie keinerlei Gegenstände durch die Gehäuseschlitze in das Gerät. Diese könnten gefährliche Spannungspunkte im Geräteinneren berühren und einen elektrischen Schlag, einen Brand oder ein Versagen des Gerätes verursachen.
- Stellen Sie keine schweren Geräte auf das Netzkabel. Eine Beschädigung des Netzkabels kann einen elektrischen Schlag oder Brand verursachen.
- Stellen Sie das Gerät niemals auf unebenen oder instabilen Gestellen, Unterlagen oder Tischen auf. Der Monitor könnte herunterfallen und schwer beschädigt werden.
- Stellen Sie den Monitor nicht in der Nähe von Hochleistungstransformatoren, Elektromotoren und anderen Geräten wie externen Lautsprechern oder Ventilatoren auf, die starke Magnetfelder verursachen können.
- Stellen Sie den Monitor wenn möglich in östlicher Richtung auf, so daß die Auswirkungen des Magnetfelds der Erde minimiert werden.
- Ein Drehen des eingeschalteten Monitors kann einen Farbverlust des Bildes verursachen. Zur Behebung dieses Problems schalten Sie den Monitor für 20 Minuten ab, bevor Sie ihn wieder einschalten.
- Wenn Sie den MultiSync FE700 Monitor mit seiner weltweiten AC 220-240 V Stromversorgung betreiben, verwenden Sie ein Netzkabel, das der Speisungsspannung der verwendeten Wechselstromsteckdose entspricht. Das verwendete Netzkabel muß den Sicherheitsnormen Ihres Landes entsprechen und gemäß dieser zugelassen sein. (Außer in Großbritannien sollte die Type H05VV-F verwendet werden).
- Verwenden Sie in Großbritannien ein für den Betrieb des Monitors vom BS zugelassenes Netzkabel mit einem integrierten Stecker mit schwarzer Sicherung (SA). Wenn zusammen mit diesem Monitor kein Netzkabel geliefert wird, wenden Sie sich bitte an Ihren Lieferanten.

Bei Eintreten der im nachfolgenden angeführten Umstände muß der Monitor sofort vom Netz getrennt und ein Service-Techniker konsultiert werden:

- Wenn das Netzkabel oder der Netzstecker beschädigt ist.
- Wenn Flüssigkeit oder Gegenstände in das Monitorgehäuse geraten sind.
- Wenn der Monitor Regen ausgesetzt war oder mit Wasser in Berührung gekommen ist.
- Wenn der Monitor fallen gelassen bzw. das Gehäuse beschädigt wurde.
- Wenn der Monitor trotz Befolgung der Bedienungsanleitung nicht ordnungsgemäß funktioniert.
 - Achten Sie auf eine ausreichende Rundum-Belüftung des Monitors, damit die Wärme richtig entweichen kann. Die Lüftungsschlitze dürfen nicht blockiert werden, und der Monitor darf nicht in der Nähe einer Heizung oder einer sonstigen Wärmequelle aufgestellt werden. Stellen Sie keine Gegenstände auf den Monitor.
 - Der Netzstecker ist das wichtigste Teil zum Trennen des Monitors vom Netz. Der Monitor sollte in der Nähe einer leicht zugänglichen Netzsteckdose installiert werden.
 - Transportieren Sie den Monitor mit äußerster Vorsicht. Bewahren Sie das Verpackungsmaterial für einen späteren Transport auf.



VORSICHT

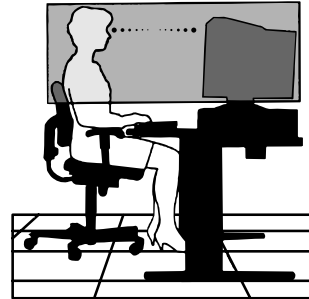
Empfehlungen für die Verwendung / Fortsetzung



EINE KORREKTE AUFSTELLUNG UND EINRICHTUNG DES MONITORS KANN BEIM ARBEITEN AM BILDSCHIRM AUGEN, NACKEN- UND SCHULTERMUSKULATUR ENTLASTEN. BEACHTEN SIE BEIM AUFSTELLEN DES MONITORS BITTE DIE FOLGENDEN PUNKTE:



- Passen Sie die Höhe des Monitors so an, daß der obere Bildschirmrand sich in oder geringfügig unter Ihrer Augenhöhe befindet. Wenn Sie die Bildschirmmitte betrachten, sollten Ihre Augen leicht nach unten blicken.
- Der Abstand vom Auge zum Monitor sollte nicht weniger als 40 cm und nicht mehr als 60 cm betragen. Der optimale Abstand beträgt 50 cm.
- Entspannen Sie Ihre Augen regelmäßig durch Fixieren eines Gegenstandes in mindestens 6 m Entfernung. Blinzeln Sie häufig.
- Stellen Sie den Monitor in einem Winkel von 90° zum Fenster und anderen Lichtquellen auf, um Blendungen und Reflexionen auf dem Bildschirm soweit wie möglich zu vermeiden. Stellen Sie die Neigung Ihres Monitors so ein, daß durch Deckenbeleuchtung verursachte Spiegelungen auf dem Bildschirm vermieden werden.
- Wenn reflektierendes Licht Ihnen das Erkennen der Bildschirmanzeige erschwert, benutzen Sie einen Anti-Reflexionsfilter.
- Reinigen Sie Ihren Monitor regelmäßig. Verwenden Sie ein fusselfreies und nicht kratzendes Tuch und eine nicht alkoholhaltige, neutrale, nicht scheuernde Reinigungslösung bzw. einen Glasreiniger, um den Staub zu entfernen.
- Stellen Sie die Helligkeit und den Kontrast Ihres Monitors so ein, daß die Lesbarkeit erhöht wird.
- Bringen Sie in der Nähe des Monitors einen Vorlagenhalter an.
- Plazieren Sie entweder den Monitor oder das Referenzmaterial (je nachdem, worauf Sie am häufigsten blicken) direkt vor sich, damit Sie den Kopf beim Schreiben so wenig wie möglich drehen müssen.
- Lassen Sie Ihre Augen regelmäßig untersuchen.



Ergonomie

Zum Erzielen eines maximalen ergonomischen Nutzens empfehlen wir eine Berücksichtigung der folgenden Punkte:

- Passen Sie die Helligkeit an, bis der Hintergrundraster nicht mehr sichtbar ist
- Stellen Sie den Kontrastregler nicht auf den Höchstwert ein
- Verwenden Sie bei Standardsignalen die Voreinstellungen für die Größen- und Positionsregler
- Verwenden Sie die Voreinstellungen für Color Setting und Sides Left/Right
- Verwenden Sie Signale ohne Zeilensprung mit einer vertikalen Bildauffrischrate zwischen 75 und 120 Hz
- Verwenden Sie die Primärfarbe Blau nicht vor einem dunklen Hintergrund, da sie schlecht zu sehen wäre und aufgrund des unzureichenden Kontrasts zu einer Überanstrengung der Augen führen könnte

Nähere Informationen über die Einrichtung einer gesunden Arbeitsumgebung erhalten Sie, wenn Sie NEC unter der Telefonnummer (800) 820-1230 bzw. NEC FastFacts unter der Telefonnummer (630) 467-4363 kontaktieren und das Dokument # 900108 anfordern. Sie können auch über The Human Factors Society, Inc. P.O. Box 1369, Santa Monica, California 90406, USA, die Norm American National Standard für Human Factors Engineering of Visual Display Terminal Workstations - ANSI-HFS Standard No. 100-1988 bestellen.

Technische Daten

| Technische Daten Monitor | | Monitor MultiSync® FE700™ | Anmerkungen |
|--|---|---|--|
| Bildröhre | Diagonal: Sichtbare Bildgröße: Radius: | 17 Zoll 16 Zoll 50,000 mm | 90° Ablenkung, 0,25 mm grille pitch, mittel/kurz nachleuchtendes Leuchtmittel, aperture grille CRT, mehrschichtige, antistatische Bildschirmkühlung, dunkler Bildschirm, und OptiClear®- Bildschirmoberfläche |
| Eingangssignal | Video: Sync: | ANALOG 0,7 Vp-p / 75 Ohm Separate Sync. TTL-Level Horizontal Sync. positiv / negativ Vertikal Sync. positiv / negativ Gesamt Sync. (positiv / negativ) (TTL-Level) | |
| Display-Farben | Analoges Eingangssignal: | Unbegrenzte Anzahl von Farben | Abhängig von der benutzten Grafikkarte. |
| Synchronisationsbereich | Horizontal: Vertikal: | 31 kHz bis 70 kHz 55 Hz bis 120 Hz | Automatisch Automatisch |
| Unterstützte Auflösungen Nur Auflösungen, die auf horizontalen und vertikalen Frequenzen beruhen | | 640 x 480 @ 60 bis 120 Hz 800 x 600 @ 55 bis 110 Hz 832 x 624 @ 55 bis 105 Hz 1024 x 768 @ 55 bis 87 Hz 1152 x 870 @ 55 bis 77 Hz 1280 x 1024 @ 55 bis 66 Hz | Einige Systeme unterstützen unter Umständen nicht alle der aufgelisteten Modi. Für optimale Darstellungsleistung des Monitors empfiehlt NEC eine Auflösung bei 85 Hz. |
| Aktivanzeige (Werkseinstellung) | Horizontal: Vertikal: | 315 mm/12,4 Zoll 236 mm/9,3 Zoll | In Abhängigkeit vom verwendeten Signaltiming und ohne den Grenzbereich. |
| Aktivanzeige (Voll) | | 325 mm/12,8 Zoll 243 mm/9,6 Zoll | In Abhängigkeit vom verwendeten Signaltiming und ohne den Grenzbereich. |
| Netzspannung | | AC 100-240 V, 50/60 Hz | |
| Tension d'alimentation | | 1,8 A @ 100-240 V | |
| Abmessungen | | 403 mm (B) x 427 mm (H) x 424 mm (T) 15,9 Zoll (B) x 16,8 Zoll (H) x 16,7 Zoll (T) | |
| Gewicht | | 19,0 kg 41,9 Pfund | |
| Umweltbedingungen | Betriebstemperatur: Luftfeuchtigkeit: Höhe: Lagertemperatur: Luftfeuchtigkeit: Höhe: | +10° C bis +35° C / +50°F bis +90°F 30 % bis 80 % 0 bis 10,000 Fuß -20° C bis +60° C / -4°F bis +140°F 10 % bis 90 % 0 bis 45,000 Fuß | |

ANMERKUNG: Technische Daten können ohne vorherige Ankündigung geändert werden.

Funktionen

Flat Aperture Grille CRT: Sorgt für ein einzigartiges Bilderlebnis mit einer praktisch flachen Bildanzeige, beseitigt jede Verzerrung und reduziert die Blendung, so daß Sie auf dem Bildschirm genau das sehen, was auch auf dem Ausdruck zu sehen sein wird. Die streifenförmige Anordnung des Leuchtstoffes auf der Kathodenstrahlröhre gewährleistet überlegene vertikale Definition bei verbesserter Helligkeit, wodurch der Bildkontrast einheitlicher wird.

OptiClear® Bildschirmoberfläche: Reduziert Reflexionen und Blendung und erhöht den Kontrast ohne Einbußen an Schärfe, Klarheit oder Helligkeit. In Kombination mit der flachen Kathodenstrahlröhre mit Flat-Square-Technologie sorgt ein kontraststarker Bildschirm mit einer von 0,25 mm grille pitch für eine klare und saubere Anzeige von Text und Bild.

Zweifache dynamische Strahlfokussierung: Sorgt für präzise kontinuierliche Fokussierung der Elektronenstrahlen und für optimale Bildqualität bis an die Seitenränder des Bildschirms.

AccuColor® Control System: Erlaubt Ihnen, zwischen fünf Farbeinstellungen auf Ihrer Bildschirmanzeige zu ändern, um Ihre persönliche Präferenz zusammenzubringen.

OSM™-Einstellfunktionen (On-Screen-Manager): Erlauben es Ihnen, alle Elemente Ihres Monitorbilds mit Hilfe einfach und rasch zu verwendender On-Screen-Menüs anzupassen.

ErgoDesign®: Verbessert die ergonomischen Eigenschaften, um die Arbeitsumgebung zu verbessern, die Gesundheit des Benutzers zu schützen und Geld zu sparen. Beispielsweise stehen OSM-Einstellfunktionen für rasche und einfache Bildanpassung und ein Schwenk-/Drehfuß für die Einstellung des bevorzugten Blickwinkels zur Verfügung. Außerdem entspricht das Gerät den MPRII-Richtlinien für verringerte Emissionen.

Plug-and-Play: Die Microsoft®-Lösung mit dem Betriebssystem Windows® 95/98 erleichtert die Einrichtung und Installation, indem die Eigenschaften des Monitors (z.B. Bildschirmgröße und unterstützte Auflösungen) direkt vom Monitor an den Computer übermittelt werden, wodurch die Anzeige automatisch optimiert wird.

IPM™-System (Intelligent Power Manager): Bietet innovative Energiesparmethoden, die es dem Monitor erlauben, auf einen geringeren Stromverbrauch zurückzuschalten, wenn er zwar eingeschaltet ist, aber gerade nicht benutzt wird. So können Sie zwei Drittel der Stromkosten für den Monitorbetrieb sparen, die Emissionen reduzieren und gleichzeitig die Kosten für die Klimatisierung des Arbeitsplatzes verringern.

Reduced Magnetic Field™-Technologie: Reduziert magnetische Emissionen und Wechselstromfelder sowie statische Elektrizität und entspricht damit den ergonomischen Anliegen in Bezug auf die Minimierung potentieller Risiken in Zusammenhang mit dem umfangreichen Gebrauch von Computermonitoren.

Mehrfrequenztechnologie: Der Monitor wird automatisch auf die Abtastfrequenz der Grafikkarte eingestellt, wodurch das Bild in der erforderlichen Auflösung angezeigt wird.

FullScan™: Erlaubt es Ihnen, in den meisten Auflösungsbereichen die gesamte Bildschirmfläche zu nutzen, wodurch die Bildgröße signifikant gesteigert wird.

OSM Display Screen Copyright 1999, NEC Technologies, Inc.

Fehlerbehebung

Keine Bildanzeige

- Vergewissern Sie sich, daß die Grafikkarte vollständig eingeschoben ist.
- Vergewissern Sie sich, daß der Einschaltknopf des Monitors und der Einschaltknopf des Computers auf ON stehen.
- Vergewissern Sie sich, daß das Signalkabel ordnungsgemäß an Computer und Grafikkarte angeschlossen ist.
- Vergewissern Sie sich, daß keiner der Kontaktstifte der Steckverbindung verbogen oder eingedrückt ist.

Das Bild rollt oder ist instabil

- Vergewissern Sie sich, daß das Signalkabel ordnungsgemäß an den Computer angeschlossen ist.
- Überprüfen Sie die Stiftbelegung und das Signaltiming des Monitors und ihrer Grafikkarte und vergewissern Sie sich, daß die Empfehlungen in bezug auf Timing und Stiftbelegung eingehalten werden.
- Falls ein Macintosh-Kabeladapter verwendet wird, überprüfen Sie, ob er korrekt angeschlossen ist, oder vergewissern Sie sich, daß die Grafikkarte Macintosh-kompatibel ist. Überprüfen Sie die Karte auf ordnungsgemäßen Sitz.

LED am Monitor leuchtet nicht *(keine grüne, orange, gelbe Farbe sichtbar)*

- Vergewissern Sie sich, daß der Einschaltknopf auf ON steht und daß das Netzkabel ordnungsgemäß angeschlossen ist.

Das Bild ist verschwommen oder die Farbe sieht fleckig aus

- Stellen Sie Helligkeit und Kontrast ein.
- Suchen Sie über die OSM™-Bedienungstasten die Einstelloption Degauss auf. Aktivieren Sie die Degauss-Funktion.
ACHTUNG: Sie sollten mindestens 20 Minuten warten, bevor Sie die Degauss-Funktion ein zweites Mal aktivieren, sofern Sie nicht auf einen anderen Modus umschalten.

Das Bild zuckt oder ist durch ein Wellenmuster gestört

- Entfernen Sie elektrische Geräte, die allenfalls elektrische Interferenzen verursachen könnten, aus der Nähe des Monitors.
- Informationen der FCC finden Sie auf der Innenseite des Umschlags des Benutzerhandbuchs.

Die Ecken des angezeigten Bildes sind nicht rechtwinkelig

- Verwenden Sie die OSM-Funktion Geometry, um die Ecken gerade zu bekommen.
- Positionieren Sie den Monitor wenn möglich so, daß er nach Osten sieht.

Das Bild ist nicht zentriert, zu klein oder zu groß

- Verwenden Sie den OSM-Größen- und Positionsregler, um das Bild einzurichten.

Auf dem Bildschirm erscheinen dünne Linien

- Dünne Linien sind normal für eine Kathodenstrahlröhre mit Lochmaske und bedeuten keine Fehlfunktion. Es handelt sich lediglich um Schatten der zur Stabilisierung der Lochmaske dienenden Dämpfungsdrähte, die hellem Bildschirmhintergrund (üblicherweise weiß) am deutlichsten sichtbar werden.

Verweise

- **BBS (978) 742-8706**

Das Remote Bulletin Board System von NEC Technologies ist ein elektronischer Service, den Sie mit Hilfe Ihres Systems und eines Modems nutzen können. Die Kommunikationsparameter lauten: 300/1200/2400/9600/14,4k/28,8k bps, keine Parität, 8 Datenbits, 1 Stopbit

- **Kundendienst/ Technischer Support (800) 632-4662**
Fax (978) 742-7049

- **Elektronische Kommunikationskanäle:**

Internet E-mail: tech-support@necotech.com
 Internet ftp-Site: ftp.necotech.com
 World Wide Web: http://www.necotech.com
 Produkt registrieren: http://www.necotech.com/productregistration
 Windows®95/98-INF File: http://cssweb.necotech.com/common/drivers.htm
 Laden Sie die Datei NECMSINF.ZIP herunter

- **FastFacts™-Information (630) 467-4363**

| INFORMATION | BESCHREIBUNG | DOKUMENT Nr. |
|------------------------------|---|--------------|
| Glossar | Definition von Ausdrücken in bezug auf Funktionen, Eigenschaften und die Installation des MultiSync Monitors | 900203 |
| Weitere Informationen | Namen und Adressen anderer Gruppen, die in bezug auf die Standards und Eigenschaften des MultiSync Monitors kontaktiert werden können | 900204 |
| Anschluß an Macintosh-Geräte | Detaillierte Informationen über den Anschluß von MultiSync Monitoren an Macintosh-Computer | 153006 |
| Gesundes Arbeitsumfeld | Detaillierte Informationen über die Einrichtung eines gesunden Arbeitsumfelds | 900108 |

- **Literatur & Vertriebsinformationen (800) NEC-INFO [(800) 632-4636]**

- **MultiSync Bestellungen (800) 820-1230**
 [Software und Zubehör]

- **Tele-Vertrieb (800) 284-4484**

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TCO'99

Herzliche Gratulation! Sie haben gerade eines der unter TCO'99 zugelassenen und zertifizierten Produkte erworben. Damit steht Ihnen ein Produkt zur Verfügung, das für die gewerbliche Anwendung entwickelt wurde. Ihr Kauf hat außerdem dazu beigetragen, die Umweltbelastung zu reduzieren und die weitere Entwicklung umweltgerechter Elektronikprodukte zu fördern.



Warum haben wir umweltzertifizierte Computer?

In vielen Ländern ist die Umweltzertifizierung mittlerweile zu einer etablierten Methode geworden, die Anpassung von Gütern und Dienstleistungen an die Bedürfnisse unserer Umwelt zu fördern. Das Hauptproblem im Bereich der Computer und sonstigen elektronischen Geräte besteht darin, daß sowohl in den Produkten als auch während ihrer Herstellung umweltschädliche Substanzen zur Anwendung gelangen. Da die Mehrzahl der elektronischen Geräte nicht auf zufriedenstellende Art und Weise wiederverwertet werden kann, landen die meisten dieser potentiell schädlichen Substanzen früher oder später in der Natur.

Darüber hinaus haben Computer noch weitere Eigenschaften - wie beispielsweise den Stromverbrauch - die sowohl vom inneren Standpunkt (des Arbeitsumfeldes) als auch vom äußeren Standpunkt (der Umwelt) her bedeutsam sind. Da alle Methoden der konventionellen Elektrizitätserzeugung negative Auswirkungen auf die Umwelt haben (sauer Regen, klimabeeinflussende Emissionen, radioaktiver Müll etc.) muß unbedingt Energie eingespart werden. Elektronische Geräte in Büros verbrauchen Unmengen von Energie, da sie oft ohne Unterbrechung eingeschaltet bleiben.

Worum geht es bei der Zertifizierung?

Dieses Produkt erfüllt die Erfordernisse des Systems TCO'99 für die internationale Zertifizierung und Umweltzertifizierung von Personalcomputern. Das Zertifizierungssystem wurde im Rahmen einer Zusammenarbeit zwischen dem TCO (Schwedischer Arbeitnehmerbund), dem Svenska Svenska Naturskyddsforeningen (Schwedische Gesellschaft für die Erhaltung der Natur) und dem Statens Energimyndighet (Nationale Verwaltungsbehörde für Energie in Schweden) entwickelt.

Die Erfordernisse, die ein Produkt für eine Zertifizierung erfüllen muß, decken zahlreiche verschiedene Bereiche ab: Umwelt, Ergonomie, Verwendbarkeit, Emission magnetischer und elektrischer Felder, Energieverbrauch, elektrische Sicherheit und Brandschutz.

Die Umwelterfordernisse betreffen unter anderem Einschränkungen bezüglich des Vorhandenseins und der Verwendung von Schwermetallen, bromierten und chlorierten Entflammungsverzögerern, Fluorchlorkohlenwasserstoffen (Freone) und chlorierten Lösungsmitteln. Das Produkt muß für eine Wiederverwertung geeignet sein, und der Hersteller muß einen Umweltplan haben, der in jedem Land, in dem die Gesellschaft ihre Betriebsstrategie implementiert, eingehalten werden muß. Die Erfordernisse in bezug auf die Energie besagen, daß der Computer und/oder das Display nach einer bestimmten Inaktivitätsdauer seinen Stromverbrauch in einer oder mehreren Stufen herabschalten muß. Die für eine Reaktivierung des Computers erforderliche Zeitspanne muß für den Benutzer annehmbar sein. Zertifizierte Produkte müssen strenge Umweltauflagen erfüllen, beispielsweise in Zusammenhang mit einer Reduzierung von elektrischen und magnetischen Feldern, ihren ergonomischen Eigenschaften in bezug auf den gesamten Körper sowie die Augen und guten Verwendungseigenschaften.

Umweltkriterien

Entflammungsverzögerer

Entflammungsverzögerer sind in Leiterplatten, Kabeln, Drähten, Gehäusen und Außenhüllen enthalten. Ihre Funktion besteht darin, die Ausbreitung von Flammen zu verzögern. Bis zu dreißig Prozent des Kunststoffes eines Computergehäuses können aus entflammungsverzögernden Substanzen bestehen. Die meisten Entflammungsverzögerer enthalten Brom oder Chlor und sind verwandt mit einer weiteren Gruppe von Umweltgiften, den PCBs (polychlorierten Biphenylenen), die im Verdacht stehen, schwere Gesundheitsstörungen zu verursachen und unter anderem aufgrund

TCO'99 / Fortsetzung

bioakkumulativer Prozesse* auch negative Auswirkungen auf die Vermehrung fischfressender Vögel und Säugetiere zu haben. Entflammungsverzögerer wurden auch im menschlichen Blut gefunden, und die Wissenschaftler fürchten, daß sie Störungen der fetalen Entwicklung zur Folge haben könnten.

TCO'99 verlangt, daß Plastikkomponenten, die mehr als 25 Gramm wiegen, keine Entflammungsverzögerer mit organisch gebundenem Chlor oder Brom enthalten dürfen. In Leiterplatten sind Entflammungsverzögerer zulässig, da es noch keinen Ersatz gibt.

Blei**

Blei findet sich in Bildröhren, Anzeigebildschirmen, Lötmetallen und Kondensatoren. Blei schädigt das Nervensystem und verursacht in höheren Dosen Bleivergiftungen.

TCO'99 erlaubt die Verwendung von Blei, da bisher noch kein Ersatz dafür entwickelt wurde.

Kadmium**

Kadmium ist in wiederaufladbaren Batterien und in den farbgenerierenden Schichten bestimmter Computerdisplays enthalten. Kadmium schädigt das Nervensystem und ist in hohen Dosen giftig.

TCO'99 fordert, daß Batterien, die farbgenerierenden Schichten von Anzeigebildschirmen und die elektrischen oder elektronischen Komponenten überhaupt kein Kadmium enthalten dürfen.

Quecksilber**

Quecksilber findet sich mitunter in Batterien, Relais und Schaltern. Quecksilber schädigt das Nervensystem und ist in hohen Dosen giftig.

TCO'99 besagt, daß Batterien überhaupt kein Quecksilber enthalten dürfen. Darüber hinaus dürfen auch die mit der Displayeinheit zusammenhängenden elektrischen oder elektronischen Komponenten keinerlei Quecksilber enthalten.

FCKWs (Freone)

FCKWs (Freone) werden manchmal zum Waschen von Leiterplatten verwendet. FCKWs bauen jedoch Ozon ab und schädigen damit die Ozonschicht der Stratosphäre, wodurch vermehrt ultraviolettes Licht auf die Erde gelangt, wodurch wiederum das Hautkrebsrisiko (malignes Melanom) steigt.

Das relevante TCO'99-Kriterium sieht vor, daß zur Herstellung oder zum Zusammenbau des Produkts sowie zu seiner Verpackung weder Fluorchlorkohlenwasserstoffe noch halogenierte Fluorchlorkohlenwasserstoffe verwendet werden dürfen.

* "Bioakkumulativ" bezieht sich auf Substanzen, die sich in lebenden Organismen anreichern.

**Blei, Kadmium und Quecksilber sind bioakkumulative Schwermetalle.

Nähere Informationen über das die Umweltkriterien darlegende Dokument erhalten Sie bei:

TCO Development Unit

SE 114 94 Stockholm

Schweden

Faxnummer: +46 8 782 92 07

E-mail (Internet): development@tco.se

Information über die gemäß TCO'99 zertifizierten und zugelassenen Produkte finden Sie auch auf der TCO-Webseite: <http://www.tco-info.com/>

Erklärung des Herstellers

Wir bestätigen hiermit, daß der Farbmonitoren
MultiSync® FE700™ (N9705) den folgenden
Richtlinien entspricht:

Richtlinie des Rates 73/23/EEC:

- EN 60950

Richtlinie des Rates 89/336/EEC:

- EN 55022
- EN 60555-2
- EN 61000-3-3
- EN 50082-1
- (IEC-801-2)
- (IEC-801-3)
- (IEC-801-4)

und folgende Kennzeichnung trägt



NEC Home Electronics, LTD.
686-1, NISHIOI OI-MACHI,
ASHIGARAKAMI-GUN
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Röntgenstrahlung

Die in diesem Gerät erzeugten Röntgenstrahlen sind durch die eigensichere Kathodenstrahlröhre ausreichend abgeschirmt.

Unsachgemäße Eingriffe, insbesondere Veränderungen der Hochspannung oder Einbau eines anderen Bildröhrentyps, können dazu führen, daß Röntgenstrahlung in erheblicher Stärke auftritt. So veränderte Geräte entsprechen nicht mehr dieser Zulassung und dürfen nicht betrieben werden.

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| | |
|--------------------------------------|---------------------------------------|
| Verantwortlich in den U.S.A.: | NEC Technologies, Inc. |
| Anschrift: | 1250 N. Arlington Heights Road |
| | Itasca, Illinois 60143 |
| Telefonnummer: | (630) 467-5000 |

| | |
|-----------------------|----------------------|
| Art des Produkts: | Computermonitor |
| Ausrüstungskategorie: | Klasse B, Peripherie |
| Modelle: | N9705 |



Wir erklären hiermit, daß die obengenannte Ausrüstung den in den FCC-Bestimmungen enthaltenen technischen Standards entspricht.

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This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

| | |
|--------------------------------|---------------------------------------|
| U.S. Responsible Party: | NEC Technologies, Inc. |
| Address: | 1250 N. Arlington Heights Road |
| | Itasca, Illinois 60143 |
| Tel. No.: | (630) 467-5000 |

Type of Product: Computer Monitor
Equipment Classification: Class B Peripheral
Models: N9705



*We hereby declare that the equipment specified above
conforms to the technical standards as specified in the FCC Rules.*

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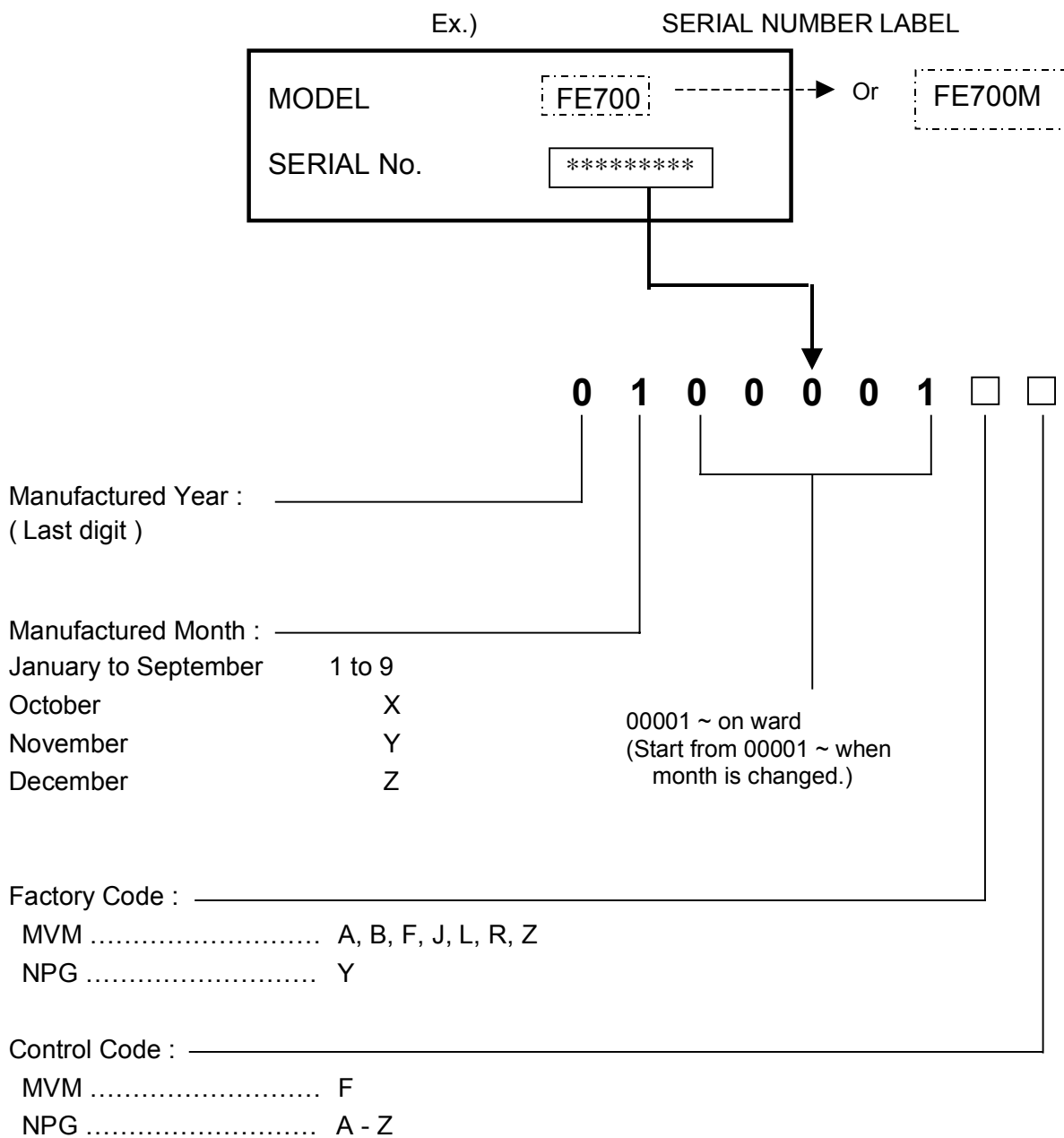
As an ENERGY STAR® Partner, NEC Technologies has determined that this product meets the ENERGY STAR guidelines for energy efficiency. The ENERGY STAR emblem does not represent EPA endorsement of any product or service.



Part No. 78135521
Printed in U.S.A.

SERIAL NUMBER INFORMATION

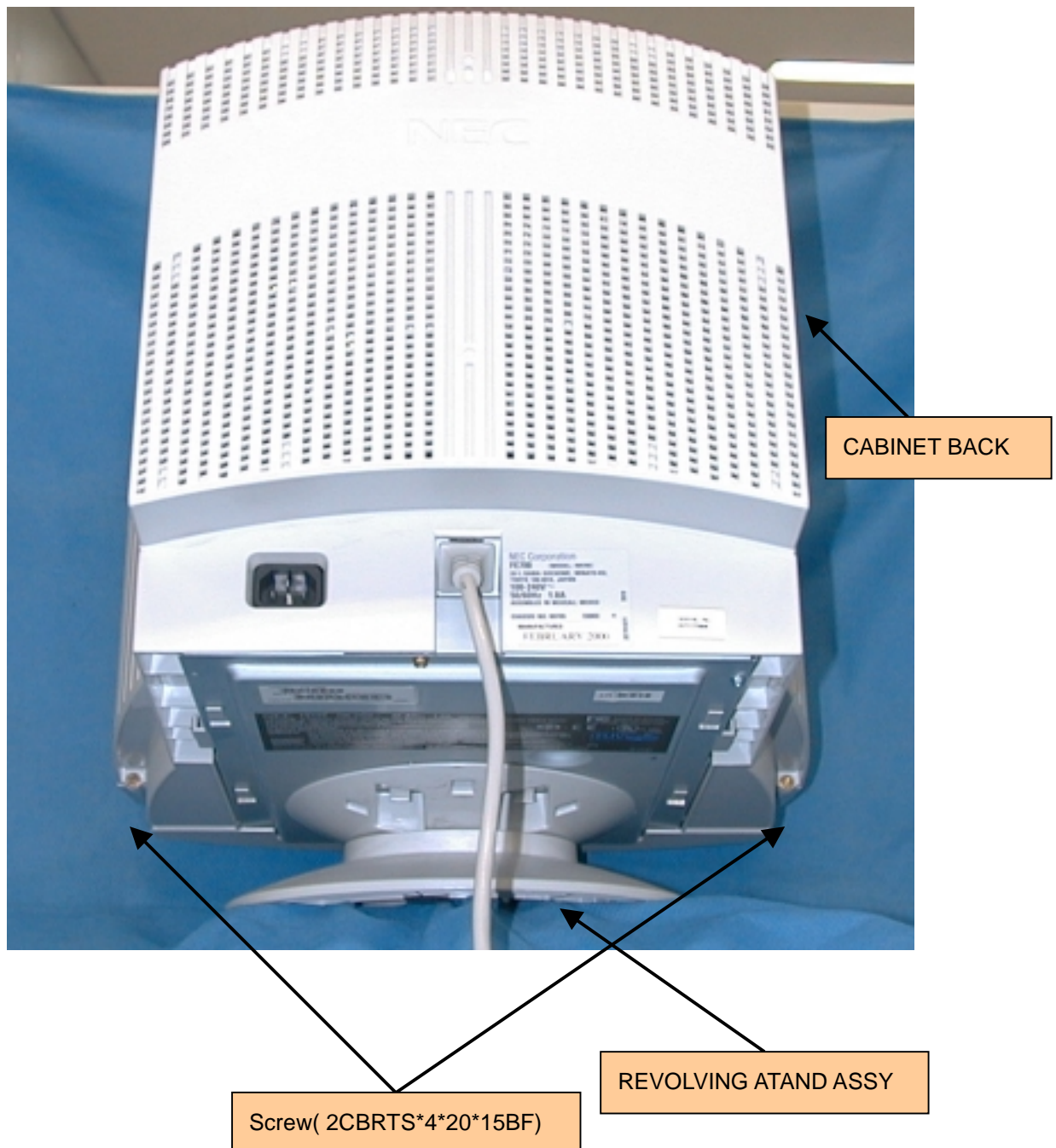
Refer to the serial number information shown below.



DIS-ASSEMBLY

Remove the REVOLVING ATAND ASSY.

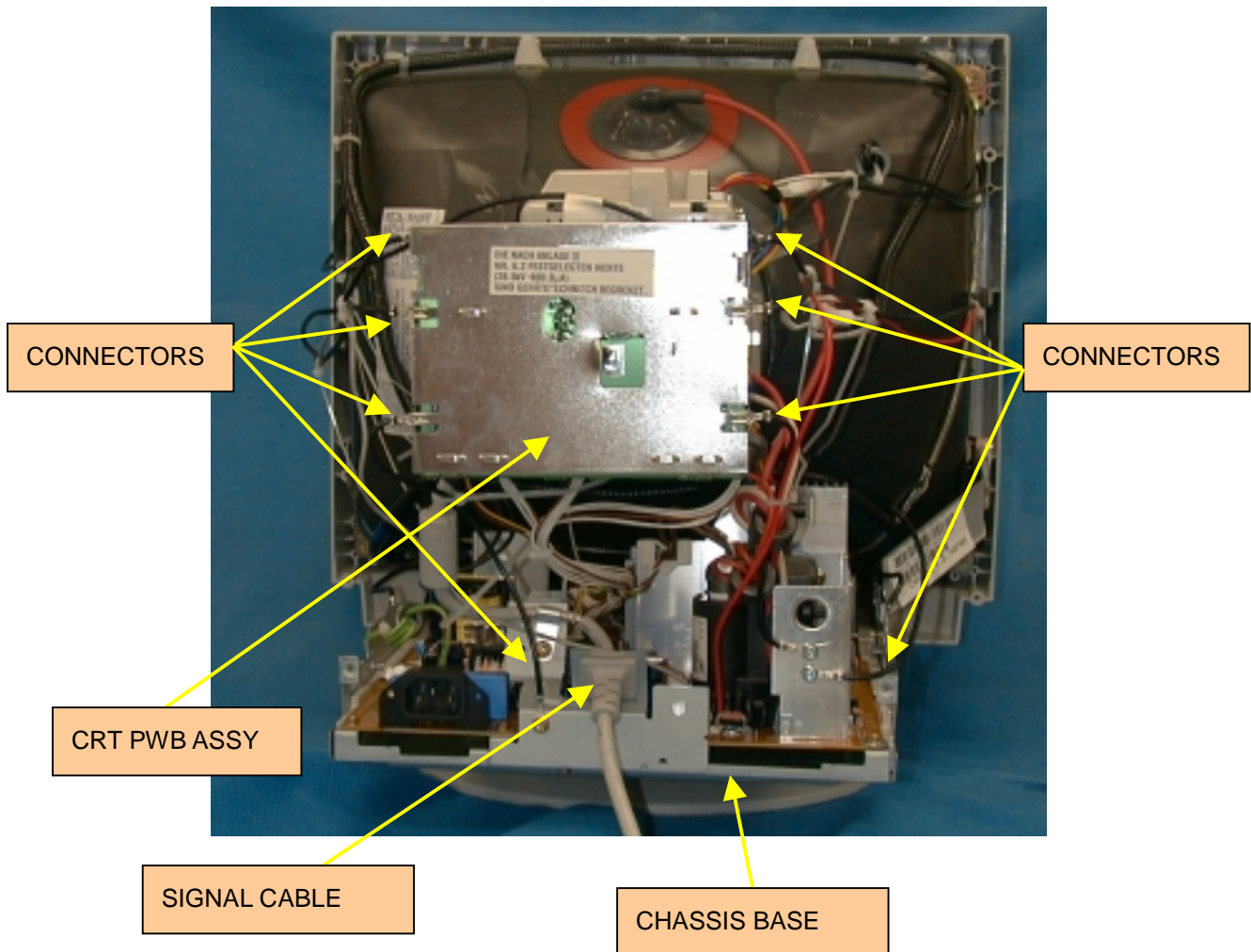
Remove the CABINET BACK with the screws.



Remove the connectors from the CRT EATH ASSY.

Remove the connectors on the MAIN PWB ASSY.

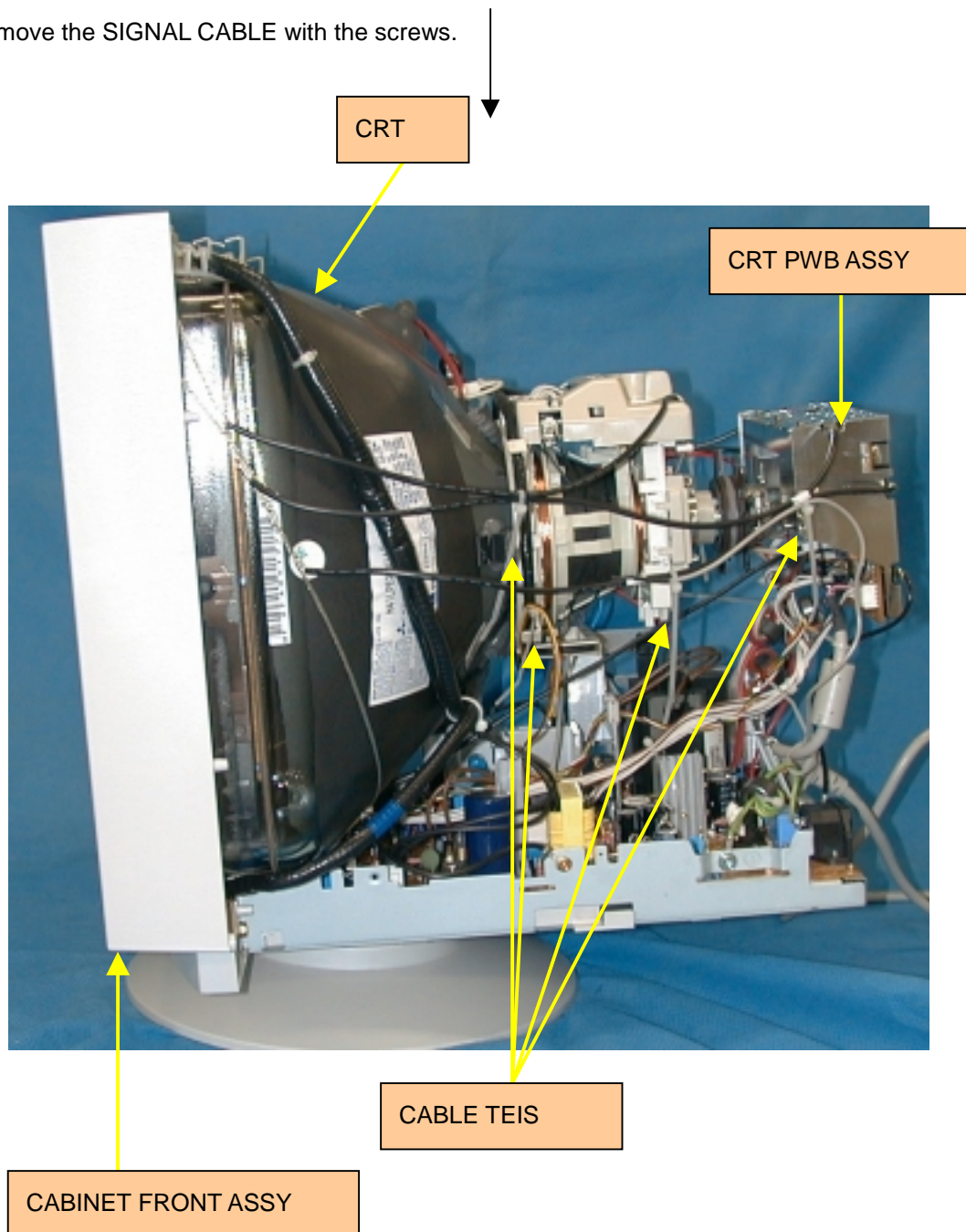
Remove the connectors on the CRT PWB ASSY.



Cut off the cable teis.

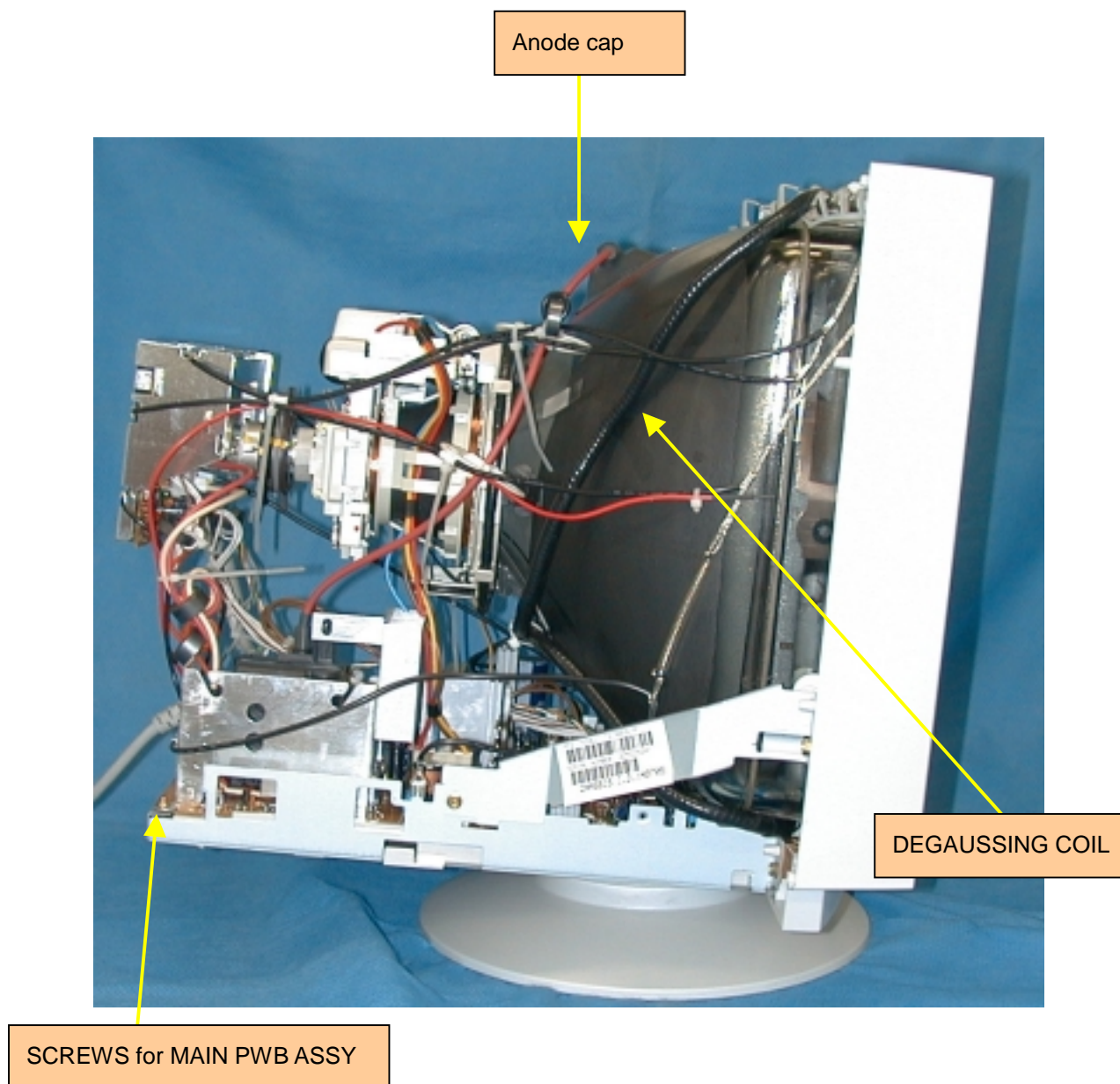
Removed the CRT PWB ASSY from the CRT SOCKET.

Remove the SIGNAL CABLE with the screws.



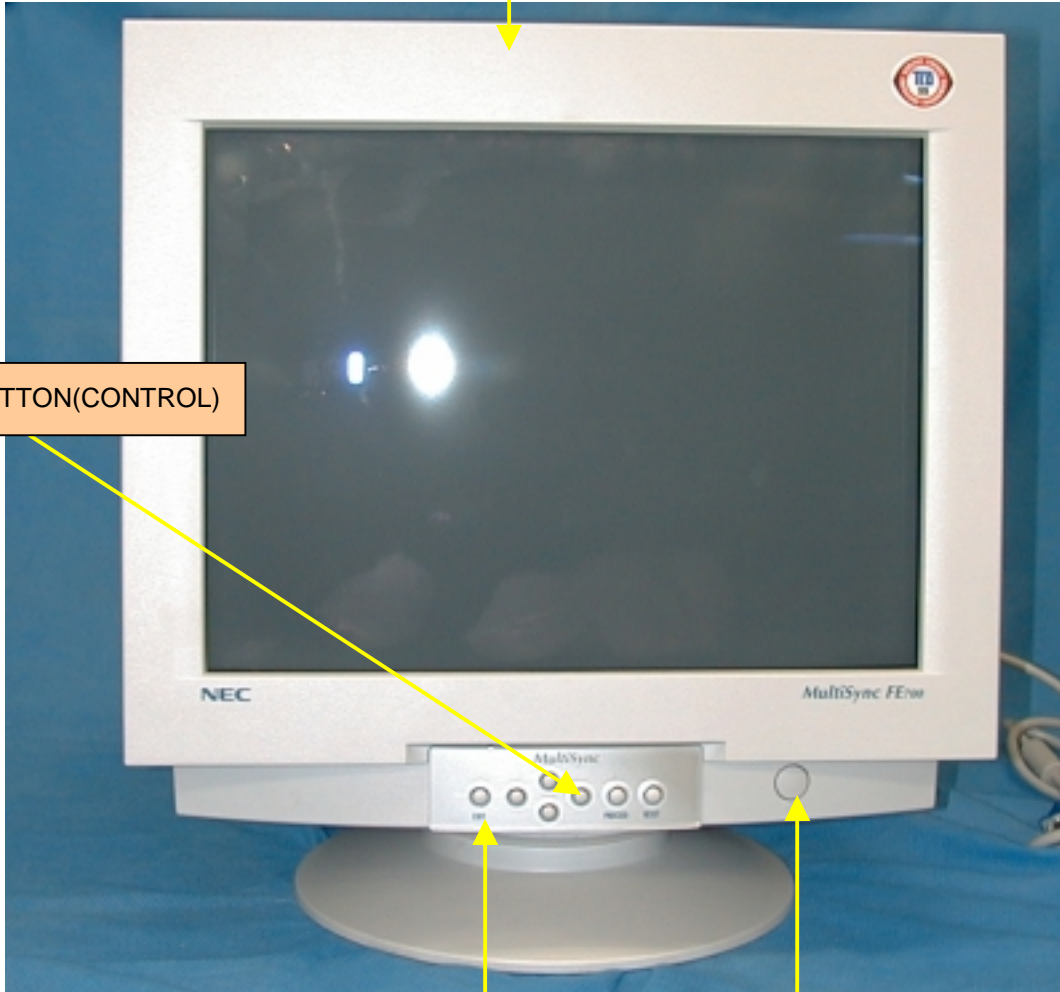
Remove the anode cap.

Remove the MAIN PWB ASSY with the screws.



CABINET FRONT ASSY

PUSH BUTTON(CONTROL)



PUSH BUTTON(SW)(B)

CONTROL PANEL

ADJUSTMENT PROCEDURES

1. Application

These specifications outline the adjustment procedures for Models N9705 17 inch color monitor.

Model Number: N9705 (A)/(B)

Destination: North America, Europe, Asia and others

2. Standard Adjustment Conditions

2-1. Power Supply Voltage

AC 120 V \pm 5% 60Hz

2-2. Warm Up

Adjust this monitor after a minimum of sixty minutes to allow unit to reach ambient operating temperature.

Set VR302 and VR307 to mechanical center, and adjust SCREEN VR to back raster just cut off.

Receive signal 3 (VGA480) and adjust just full scan by OSD control.

And enter heat running mode.

※ Do not extend a picture beyond full-scan concerning backraster and displayed picture during warm-up.

2-3. Signals

Video: Analog 0.7 \pm 0.01 Vp-p Positive (terminated at 75 ohms \pm 1%)

Sync: TTL level

H/V separate, positive / negative

or H/V composite, positive / negative

2-4. Magnetic Fields

| | Vertical Magnetic Fields | Horizontal Magnetic Fields |
|---------------|--------------------------|----------------------------|
| A / B version | 35 \pm 1 μ T | 30 \pm 1 μ T |

* Unless instructed otherwise, the CRT face should be facing to the east.

* Degauss the entire unit with an external degaussing coil for the adjustment.

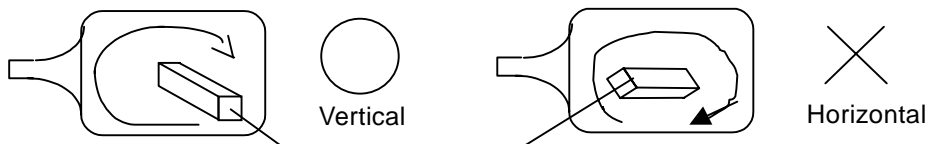
※Notes about degaussing method

Follow the degaussing procedure below. (For prevent intertwinement of aperture grille.)

- 1) Use stick type degaussing coil at degaussing CRT. Do not use ring degaussing coil.
But ring degaussing coil can be used at degaussing chassis.
- 2) Open Menu (U),TAG 7 "DISPLAY MODE" and push "PROCEED".
- 3) Push "+" SW and "▲" SW at the same time.
- 4) Confirm to display "DEGAUSS OK"
- 5) In order to remove a magnetization from front, top, bottom and side of CRT, and bottom chassis.
Do not switch off the degaussing coil abruptly. Move the degaussing coil slowly when degaussing.
Note: If switch off the degaussing coil near the set, the set is magnetized.

- 6) To degauss panel surface.

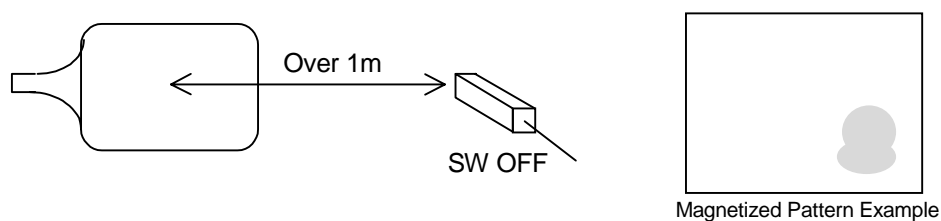
When switch on the degaussing coil, keep distance between panel surface and degaussing coil to more than 50cm. Move the degaussing coil vertically near the panel surface. Keep distance of panel surface and degaussing coil to more than 15mm.



- 7) Degaussing method of CRT surface

Starting from edge of CRT, move the degaussing coil toward CRT center in circular motion, spending 6 to 7 seconds. (about 4 or 5 round)

- 8) After sufficiently degaussing the CRT, move degaussing coil slowly away from the panel surface while rotating from corner to center, taking more than 3 seconds. Turn off SW more than 1m away from the CRT. Degauss again if the unit is magnetized.



- 9) Push "EXIT" SW to disappear "DEGAUSS OK".

2-5. Setting

Unless otherwise specified ,Controls should be as following

- 1) Brightness : Preset
- 2) Contrast : MAX

2-6. Adjustment equipment

The adjustment should be conducted using the following equipment.

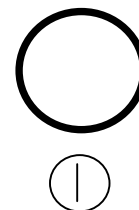
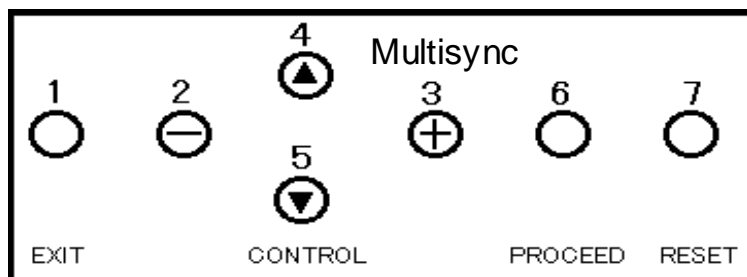
Alternate equipment may be used if they are measured the correlation data with following equipment.

| | |
|---------------------------|--|
| Video Signal generator : | Leader Electronics LVG-1603 / Astrodesign VG-819 |
| Brightness/Color meter : | Minolta Color Analyzer CA-100 |
| HV (high voltage) meter : | Sensitive Research Electrostatic Voltmeter Model ESH |
| D.C. volt meter : | Input resistance more than $1\text{M}\Omega$ |
| A.C. volt meter : | Input resistance more than $1\text{M}\Omega$ |
| Oscilloscope : | Higher than 20MHz bandwidth |
| Screen volt meter : | Maximum voltage more than 1500V Input resistance more than $1000\text{M}\Omega$ |
| Ruler : | Flexible type |
| External degaussing coil | Stick type |

Note) Adjustment timings are timing tables, not programmed timings.

3. OSM Menu Operation

3-1. Front Panel



3-2. OSM Menu

This unit is adjusted in on-screen menu by front panel key operation.

There are two types of menu.

- (1) Menu (user): This Menu can be operated by the customer.
- (2) Menu (factory): This Menu is hidden from the customer, and is used by service personal and factory.

Hereafter, they will be called MENU (U) and MENU (F).

The menu can be displayed when the signal is input to the display unit.

3-3. Factory Mode

This unit has the MCU function called "Factory Mode".

Factory Mode: OSM border color is red.
Power Management function is non-operational.

User Mode: OSM border color cyan.
When the signal cable is disconnected from the signal generator, Power Management function operates.
It is not possible to enter MENU (F) by shortcut key.

Set the factory mode to the ON condition before adjustment.
Set the factory mode to OFF (User Mode) after completing adjustment.

3-4. Factory Mode Setting

3-4-1. Enter Factory Mode

- (1) Open Menu (U), TAG 7 "DISPLAY MODE" and push "PROCEED".
- (2) Push and hold "RESET" SW and push "▼" SW at the same time.
- (3) A "WARNING" will be displayed, then push "PROCEED" SW once.
- (4) OSM border color is red.

3-4-2. Exit Factory Mode

- (1) When OSM MENU is displayed, push "EXIT" SW twice. Otherwise, push "EXIT" SW once.
- (2) When "WARNING" is displayed, push "EXIT" SW once.
- (3) OSM border color is cyan.

3-5. Heat Running Mode

This unit has the MCU function called "Heat Running Mode".

In Heat Running Mode, Monitor works following condition.

fH : 31.5kHz
fV : 60Hz
Pattern : All white

3-6. Heat Running Mode Setting

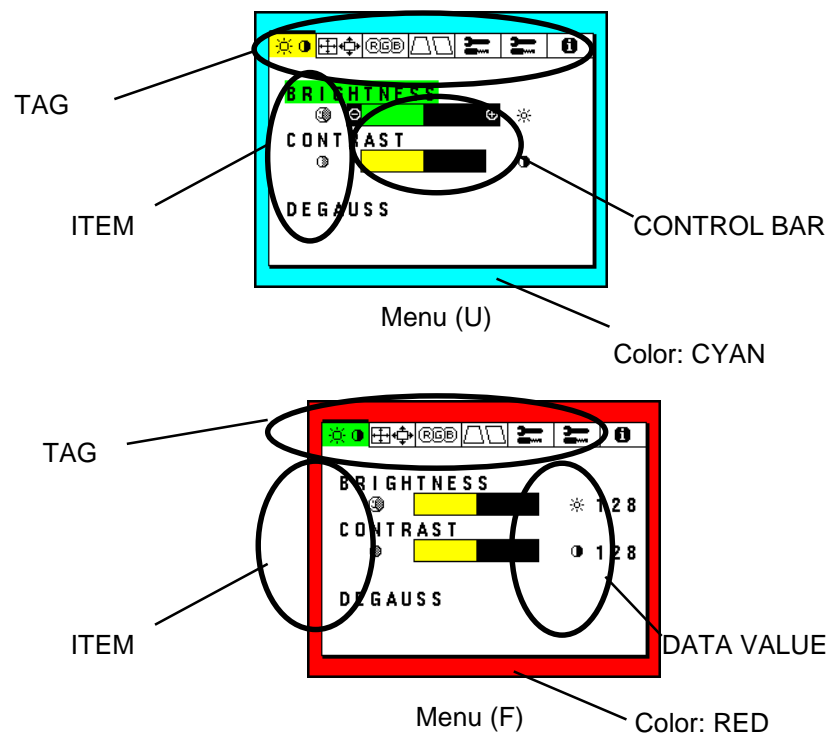
3-6-1. Enter Heat Running Mode

- A. Factory Mode : Disconnect signal cable.
- B. User Mode : Power on while push "RESET" SW without signal.

3-6-2. Exit Heat Running Mode

- A. Factory Mode : Connect signal cable.
- B. User Mode : Power off and on.

3-7. Composition of the OSM (Open Menu)



3-8. OSM Turn Off

* To Close the Menu

Push "EXIT" SW while Menu (U) or Menu (F) is displayed

* To hide MENU temporarily.

Push "PROCEED" SW once, while Menu (F) is displayed.

Push "PROCEED" SW once more, Menu (F) reappears.

3-9. TAG, Item, Change

Menu (U), (F) :

TAG to TAG : Push "—" SW or "+" SW, while TAG selected.

Item to Item : Push "▲" SW or "▼" SW.

3-10. To change Data Value

Data values are changed by pushing "—" SW or "+" SW, when ITEM selected.

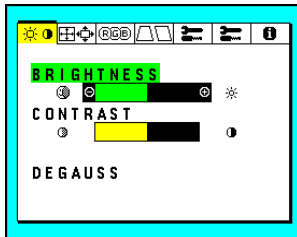
3-11. To save Data Value

Data values are saved into EEPROM, when highlighted ITEM is changed.

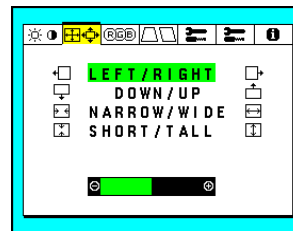
3-12. Structure of OSM Menu

3-12-1 Menu (U)

TAG 1) BRIGHTNESS / CONTRAST / DEGAUSS

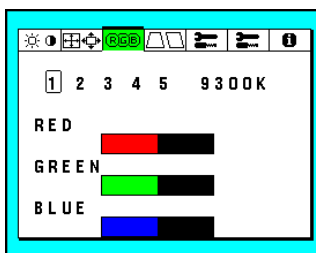


TAG 2) POSITION / SIZE

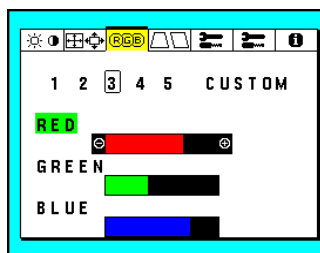


TAG 3) COLOR CONTROL

3-1) COLOR SELECT



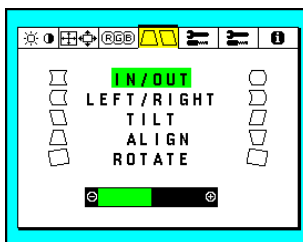
3-2) CUSTOM ADJUST



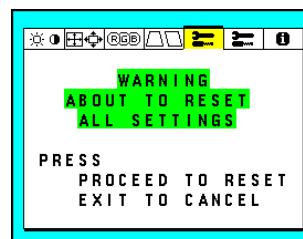
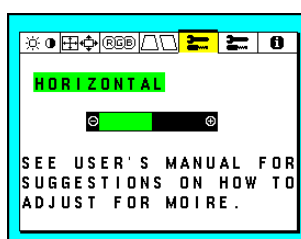
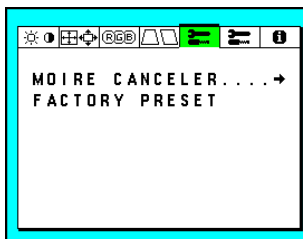
3-3) FACTORY PRESET



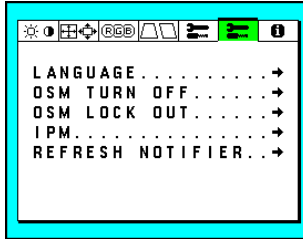
TAG 4) GEOMETRY



TAG 5) TOOL 1 5-1) MOIRE CANCELER 5-2) FACTORY PRESET



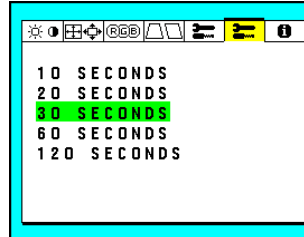
TAG 6) TOOL 2



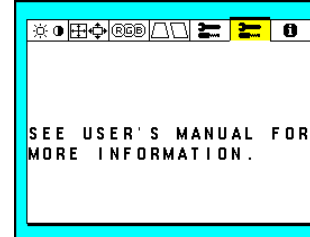
6-1) LANGUAGE



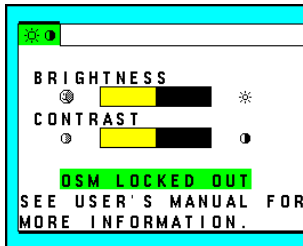
6-2) OSM TURN OFF



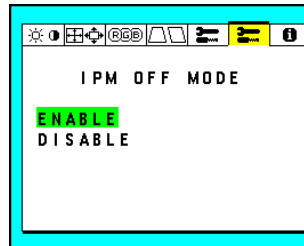
6-3) OSM LOCK OUT



6-4) OSM LOCK OUT



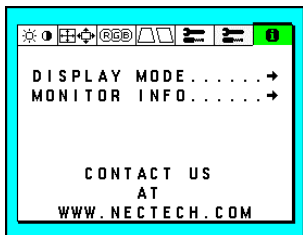
6-5) I.P.M. OFF MODE



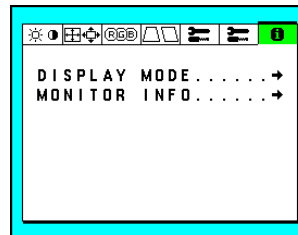
6-6) REFRESH NOTIFIER



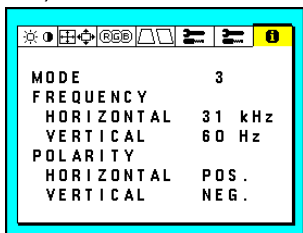
TAG7) INFORMATION FOR NORTH AMERICA Ver.



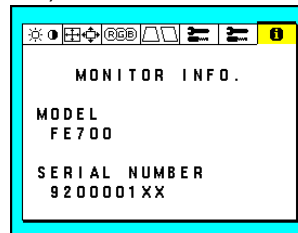
FOR ANOTHER Ver.



7-1) DISPLAY MODE

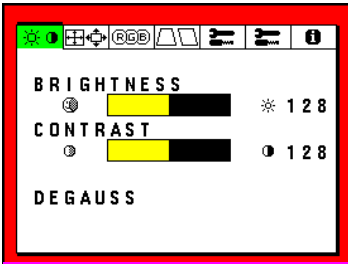


7-2) MONITOR INFO.

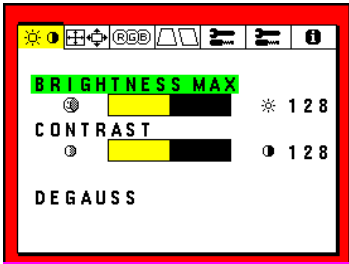


3-12-2 MENU (F)

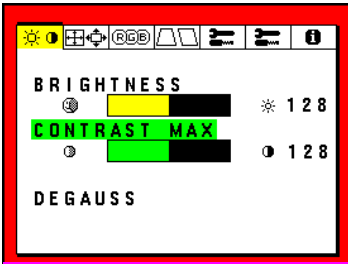
TAG 1) BRIGHTNESS /
CONTRAST /
DEGAUSS



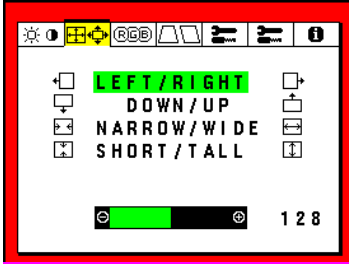
1-1) BRIGHTNESS MAX.



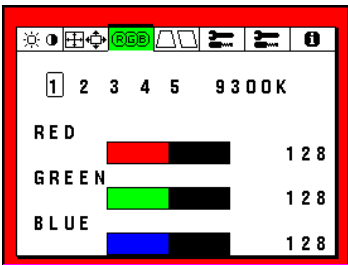
1-2) CONTRAST MAX.



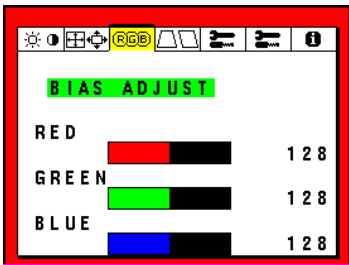
TAG 2) POSITION / SIZE



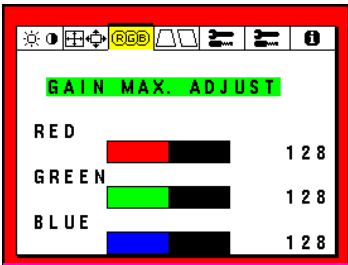
TAG 3) WHITE BALANCE /



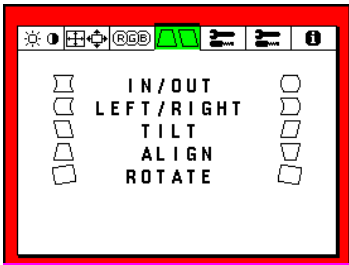
3-1) R/G/B BIAS ADJUST



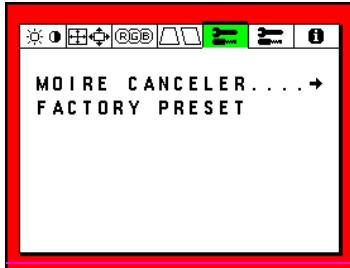
3-2) R/G/B GAIN MAX. ADJUST



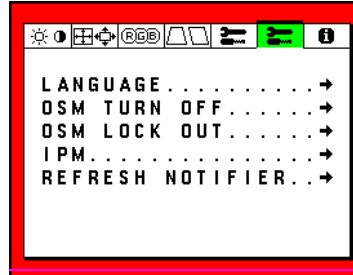
TAG4) GEOMETRY



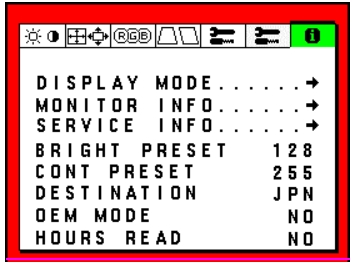
TAG 5) TOOL1



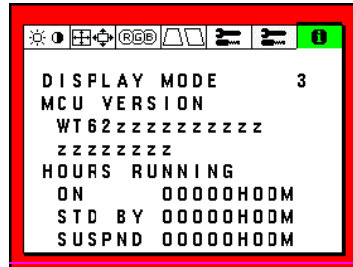
TAG 6) TOOL2



TAG 7) INFORMATION



7-1) SERVICE INFO.



*TAG1

1-1) BRIGHTNESS MAX

Change to "BRIGHTNESS MAX" when push "RESET" SW with highlighted "BRIGHTNESS" in TAG1.

1-2) CONTRAST MAX

Change to "CONTRAST MAX" when push "RESET" SW with highlighted "CONTRAST" on TAG1.

*TAG3

3-1) BIAS ADJUST

Change to "BIAS ADJUST" when push "RESET" SW with highlighted "1 2 3 4 5 9300K" in TAG3.

3-2) GAIN MAX. ADJUST

Change to "GAIN MAX. ADJUST" when push "RESET" SW with highlighted "BIAS ADJUST" in TAG3.

Change as follows when push "RESET" SW with highlighting item to select color preset.

"1 2 3 4 5 9300K" → "BIAS ADJUST" → "GAIN MAX. ADJUST" → "1 2 3 4 5 9300K"

4. ADJUSTMENT ITEMS

[A] Initial Settings

[B] Adjustment of SW. REG.

1. Adjustment method

Safety

[C] Pre-Adjustment

1. High-Voltage Adjustment

Safety

[D] Main Adjustment

1. Screen Voltage Adjustment

2. Horizontal Raster Position

3. Deflection Distortion Adjustment

3-1. Horizontal / Vertical Size Rough Adjustment

3-2. Picture Tilt Adjustment

3-3. Parallelogram Distortion Adjustment

3-4. Trapezoid distortion Adjustment

3-5. Side Pincushion Balance Adjustment

3-6. Side Pincushion Adjustment

3-7. Distortion Adjustment

4. Preset Picture Size and Position Adjustment

5. Video Amplitude Adjustment

5-1. Gain Adjustment

5-2. Cut Off Adjustment

5-3. Brightness Max Adjustment

5-4. Color Temperature Adjustment

5-5. Brightness Adjustment

6. Focus Adjustment

7. CRT Convergence

8. OSD setting

[E] Reference

1. Adjustment Signal

2. Timing of Adjustment Signals

3. Position of Connector / Test point of Adjustment and Inspection

Follow the instructions in this manual for adjustments.

- (1) After adjustment finished, close menu so as to make it memorize.
- (2) Turn the monitor back on and confirm that the adjustment values / picture level / white balance / distortion values are the same before the Menu was closed.
(When "PROCEED" SW is pushed during below Menu (F) is displayed, OSM Menu disappears.
If "PROCEED" SW is pushed once more, OSM reappears.)

All TAG1 items (except DEGAUSS), All TAG2/3/4 items, MOIRE CANCELER on TAG5, BRIGHT PRESET and CONT PRESET on TAG7.)

[A] Initial Settings

Before adjusting, set the position of control as follows.

| | | |
|------------------------------|-------------------|------------------------------|
| FBT | SCREEN VR : | Fully counterclockwise (MIN) |
| | D.FOCUS VR (F1) : | Mechanical center |
| | S.FOCUS VR (F2) : | Mechanical center |
| VR101 (SW.REG. Adjust) : | | Fully counterclockwise (MIN) |
| VR102 (HV. Voltage Adjust) : | | Fully counterclockwise (MIN) |
| VR302 (Raster cent. Adjust : | | Mechanical center |
| VR307 (G1 Voltage. Adjust) : | | Fully counterclockwise (MIN) |

[B] Adjustment of SW. REG .

Safety

1. Adjustment method

Signal: No. 105 (1024*768 @60Hz) All White, Size: preset size

Display all white and adjust SCREEN VR, so that the image is visible.

Adjust VR101 so that the voltage of D112 (cathode side) should be $13.6V \pm 0.05 V$.

[C] Pre-Adjustment

1. High-Voltage Adjustment Signal 20 (1024*768(85)) All Black

(1) Initial Setting

SCREEN VR : Fully counterclockwise (MIN)
 D.FOCUS VR (F1) : Keep the adjusted position at PKG process
 S.FOCUS VR (F2) : Keep the adjusted position at PKG process
 VR102 : Fully counterclockwise (MIN)

(2) Receive signal 20.

(3) Adjust VR102 slowly so that high voltage is $25.0 \text{ kV} \pm 0.2 \text{ kV}$.

[D] Main Adjustment

1. Screen Voltage Adjustment

Signal : No. 20 (1024*768 @85Hz) Cross hatch pattern

(1) Previous setting

Connect a high voltage probe to TP-G2 and adjust SCREEN VR to following value.

$650 \text{ VDC} \pm 5 \text{ VDC}$

(Use a high voltmeter with maximum voltage of more than 1.5 kV and input resistance is more than 1000M Ω)

Adjust VR307 so that the back raster is just appears.

Adjust D.FOCUS VR (F1) and S.FOCUS VR (F2) in order to recognize displayed characters.

2. Horizontal Raster Position

Signal: No. 20 (VESA 1024*768@85Hz) Reverse cross hatch pattern

(1) Receive signal 20.

(2) Open Menu (F), TAG 2 "LEFT/RIGHT". And adjust "—" SW so that the horizontal position is left more.

(3) Adjust VR307 on the MAIN PWB so that the right side of the back raster appears.

(4) Make sure to set the position of control as follows.

VR302 : Mechanical center

(5) Open Menu (F), TAG 2 "NARROW/WIDE", and adjust "+", "—" SW so that the horizontal size of raster is maximum just under bezel.

(6) Adjust VR302 so that the distance between XLeft and XRight meets spec as below.

$$|X_{\text{Left}} - X_{\text{Right}}| \leq 1.5 \text{ mm}$$

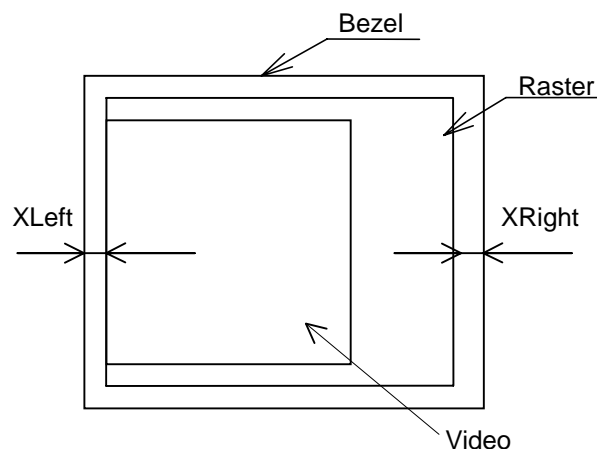


Fig 2-1 Horizontal Raster Centering

3. Deflection Distortion Adjustment

Note : Turn the CRT face to east and degauss the monitor using an external degaussing coil.
Hide the OSM menu when confirm the distortion.
When adjustment is finished, close menu to store the data values.

3-1. Horizontal / Vertical Size Rough Adjustment

Signal: No. 11 (VESA 800*600@75Hz) Reverse cross hatch pattern

(1) Receive signal 11.

(2) Open Menu (F), TAG 2 "LEFT / RIGHT", "DOWN / UP", "NARROW / WIDE ", " SHORT / TALL "
and adjust the screen size to the following values.

Horizontal Size : 315 mm \pm 8 mm

Vertical Size : 236 mm \pm 6 mm

(3) Close menu.

3-2. Picture Tilt Adjustment

Signal: No. 11 (VESA 800*600@75Hz) Reverse cross hatch pattern

(1) Receive signal 11.

(2) Open Menu "DEGAUSS OK".

(3) Turn the CRT face to east and degauss the monitor using an external degaussing coil.

(4) Make sure that the picture tilt meets the following specification :

$$X \leq \pm 1.0 \text{ mm}$$

If out of specification and cannot be adjusted, check and correct CRT assembly if necessary.

(5) Open Menu (F), TAG 4 "ROTATE" and adjust "+", "—" SW so that the picture tilt meets the following standards. The maximum correction is ± 1.0 mm.

$$X \leq \pm 0.5 \text{ mm}$$

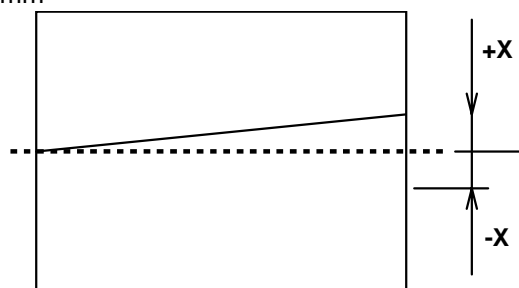


Fig 3-1 Picture Tilt

3-3. Parallelogram Distortion Adjustment

Signal: No. 11 (VESA 800*600@75Hz) Reverse Cross Hatch Pattern

(1) Open Menu (F), TAG4 " TILT ". Adjust "+", "—" SW so that the vertical line and horizontal line at the screen's center is at right angles.(maximum $90^\circ \pm 0.5^\circ$)

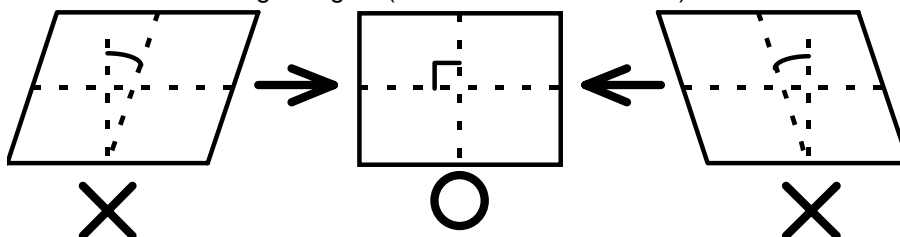


Fig 3-2 Parallelogram Distortion

3-4. Trapezoid Distortion Adjustment

Signal : 1-3 , 5-12 , 14-18 , 20 , 101 , 103 , 105

Reverse cross hatch pattern

- (1) Open Menu (F), TAG 4 " ALIGN ". Adjust "+", "-" SW so that the Trapezoid Distortion is equal to Xtop and Xbtm.

$$(| X_{top} - X_{btm} | \leq 1.0 \text{ mm})$$

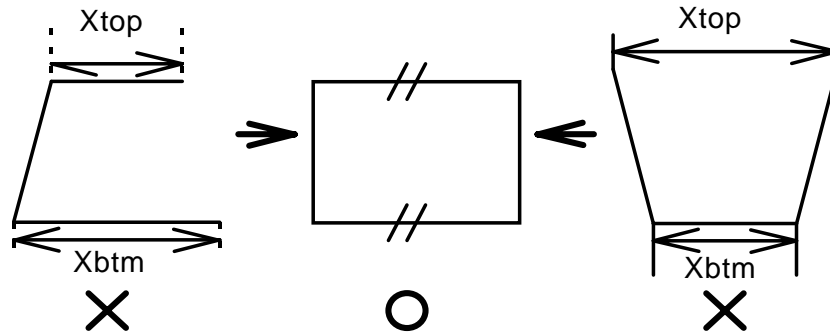


Fig 3-3 Trapezoid Distortion

3-5. Side Pincushion Balance Adjustment

Signal: No. 11 (VESA 800*600@75Hz) Reverse cross hatch pattern

- (1) Open Menu (F), TAG 4 " LEFT / RIGHT ". Adjust "+", "-" SW so that the difference of XSL and XSR is equal (maximum 1.0 mm).

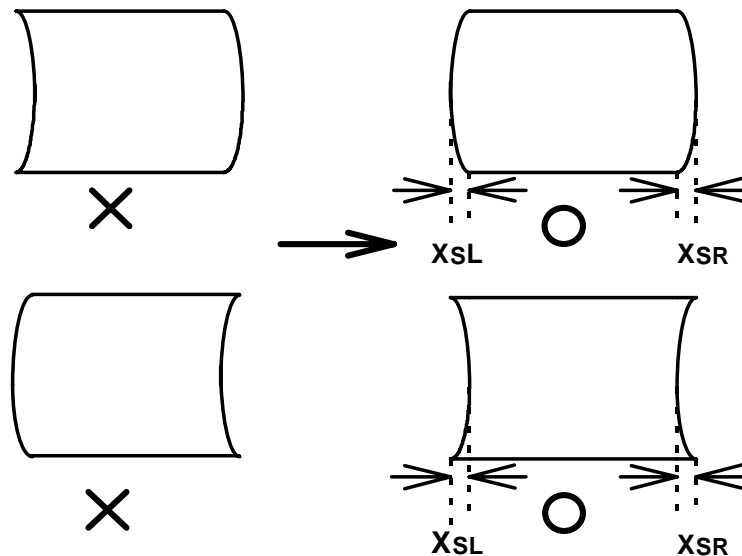


Fig 3-4 Side Pincushion Balance

3-6. Side Pincushion Adjustment

Signal : 1-3 , 5-12 , 14-18 , 20 , 101 , 103 , 105

Reverse cross hatch pattern

(1) Open Menu (F), TAG 4 " IN / OUT ". Adjust "+", "-" SW so that the side pincushion distortion is minimized (maximum ± 0.5 mm).

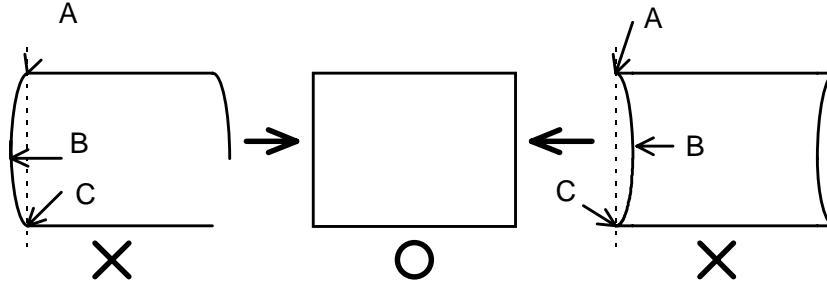


Fig 3-5 Side Pincushion

3-7. Distortion Adjustment

Signal : No. 11 (VESA 800*600@75Hz) Reverse cross hatch pattern

(1) Confirm that adjustment on steps 3-1 to 3-6 meets the specifications.

(2) If undulating, re-adjust each distortion adjustment. Undulation is a directional difference of tilt at either AC and CE or both. Following figures (I) and (II) are example. AB and BC, CD and DE are the direction of tilt. Undulated correction is the same direction of tilt at AB and BC, CD and DE. Following figures (III) and (IV) are examples. In this state, each adjustment standard must be satisfied.

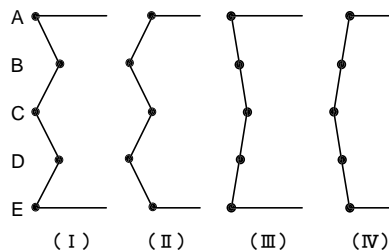


Fig 3-6 Undulated Definition

4. Preset Picture Size and Position Adjustment

Signal : No. 3 (VGA 480),
 No. 12 (VESA 640*480@85Hz),
 No. 15 (VESA 800*600@85Hz),
 No. 20 (VESA 1024*768@85Hz)
 Reverse cross hatch pattern

(1) Receive signal 3.

(2) Open Menu (F), TAG 2 " LEFT / RIGHT ", " DOWN / UP ", " NARROW / WIDE", " SHORT / TALL "
 and adjust the picture size and position as listed below by "+" , "-" SW .

Picture size H : 315 ± 6 mm

V : 236 ± 6 mm

Picture Position H : $|X_{\text{Left}} - X_{\text{Right}}| \leq 2.0$ mm

V : $|X_{\text{Top}} - X_{\text{Bottom}}| \leq 2.0$ mm

(3) Close menu.

(4) Receive the next signal and repeat steps (1) to (3).

Note : Before receiving the next signal, always push "EXIT" SW to store adjustments data.

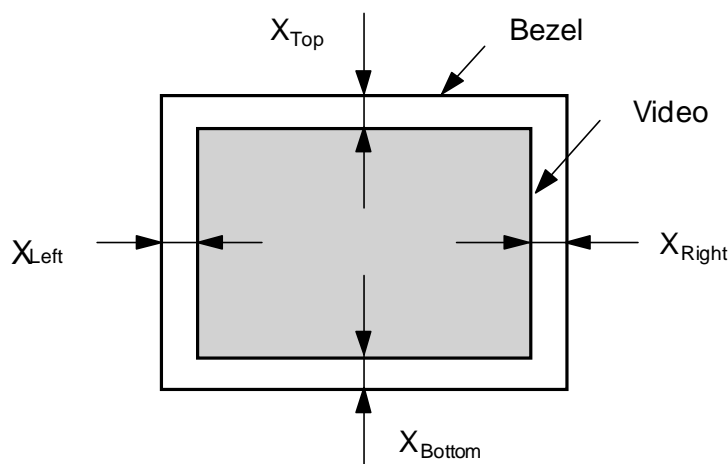


Fig 7-1 Picture Position

(5) Manual adjustment : Receive the signals below and repeat steps (2) through (3).

Auto adjustment : For the signals below, picture size and position are calculated from above adjustment data and data are written into EEPROM.

Notice : For signal 1 and 7, adjust the vertical size to maximum.

| | |
|----------------------------|---------------------------|
| Signals : No. 1 VGA 350 | No. 2 VGA 400 |
| No. 5 VESA 800*600@60Hz | No. 6 MAC 640*480 |
| No. 7 VESA 350@85Hz | No. 8 VESA 400@85Hz |
| No. 9 VESA 640*480@75Hz | No. 10 XGA |
| No. 11 VESA 800*600@75Hz | No. 14 MAC 832*624 |
| No. 16 VESA 1024*768@70Hz | No. 17 VESA 1024*768@75Hz |
| No. 18 VESA 1280*1024@60Hz | |
| No. 101 , 103 , 105 | |

5. Video Amplitude Adjustment

Make sure that the video signal level of generator is as follows :

Video : Analog 0.7 Vp-p \pm 0.01 Vp-p (terminated 75 ohms \pm 1 %)

5-1. Gain Adjustment

Signal : No. 31 (VESA 1024*768@85Hz(Window))

White window pattern

- (1) Receive the signal 31(White window pattern).
- (2) If the back raster appears, adjust VR307 on the MAIN PWB so that the back raster disappears.
- (3) Open Menu(F), TAG 1-2 "CONTRAST MAX" and adjust value to 180.
- (4) Open Menu(F), TAG 3-2 "GAIN MAX. ADJUSTMENT" and select "RED". Adjust the wave form of TP-R on the CRT PWB to 45Vp-p \pm 1Vp-p by "+", "-" SW .
(Do not include clamp pulse. Refer to Fig 5-1.)

Note : Press the "PROCEED" SW to hide OSM, while performing this adjustment.

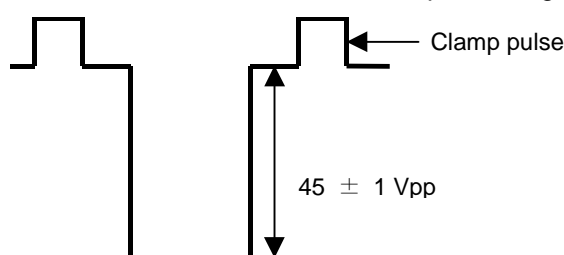


Fig 5-1 Video Amplitude (MAX)

- (5) Adjust "GREEN" and "BLUE" also.
- (6) Close menu.

5-2. Cut Off Adjustment

Signal : No. 31 (VESA 1024*768@85Hz(Window)) All black

- (1) Receive signal 31
- (2) Open Menu (F), TAG 1 "BRIGHTNESS" and set to 127.
- (3) Open Menu (F), TAG 3-1 "BIAS ADJUST".
- (4) Set "RED", "GREEN" and "BLUE" to 10.

Note : Here after, use a color analyzer CA-100. Hide the OSM menu when confirming the adjustments.

- (5) Setting 00 channel of x, y and Y mode at the color analyzer and make sure that the following value is set.

$$x = 0.291 \quad y = 0.306 \quad Y = 0.2 \text{ cd/m}^2$$

- (6) Turn the CA-100 into analyzer mode.
- (7) Turn the VR307 on the MAIN PWB clockwise until back raster appears. The color that appears first is the reference color. Adjust VR307 so that its color analyzer indicated value is 20 - 80.
- (8) Open Menu (F), TAG 3 "BIAS ADJUST" and adjust "(reference color) BIAS" so that its color analyzer indicated value is 100 - 120.
- (9) Open Menu (F), TAG 3 "BIAS ADJUST" and adjust "(other colors) BIAS" so that its color analyzer indicated value is 100 - 120.

Note : When the indicated value of the reference color is over 120, repeat steps (7) to (8).

- (10) Close menu.

5-3. Brightness Max Adjustment

Signal : No. 31 (VESA 1024*768@85Hz(Window)) All black

- (1) Receive Signal 31.
- (2) Turn the CA-100 into xyY mode.
- (3) Open Menu (F), TAG 1-1 " BRIGHTNESS MAX. " and adjust Y so that its color analyzer indicated value is $6.0 \pm 0.5 \text{ cd/m}^2$ by "+", "-" SW.

5-4. Color Temperature Adjustment

Signal : No. 31 (VESA 1024*768@85Hz(Window)) White window pattern

- (1) Receive Signal 31(White window pattern).
- (2) Open Menu (F), TAG 1 " BRIGHTNESS " and set to 110.
- (3) Setting 00 channel of x, y and Y mode at the color analyzer and make sure that the following value is set.
 $x = 0.283$ $y = 0.297$ $Y = 20 \text{ cd/m}^2$
- (4) Turn the CA-100 into analyzer mode.
- (5) Open Menu (F), TAG 1 " CONTRAST " and adjust the smallest value of color analyzer indicated value is 100 ± 5 by "+", "-" SW.
- (6) Open Menu (F), TAG 3 "(other colors) GAIN" and adjust so that its color analyzer indicated value is 100 ± 5 by "+", "-" SW. At this time, do not change the adjustment value (in 5-4(5) of the GAIN. If its color analyzer indicated value is not 100 ± 5 , adjust it by Menu (F), TAG 3 "GAIN" again.
- (7) Repeat similar adjustment for other preset color as follows.

| COL.SELECT | x | y | Y |
|------------|-------|-------|---------|
| 9000K | 0.285 | 0.297 | 20cd/m2 |
| 8500K | 0.291 | 0.306 | 20cd/m2 |
| 8000K | 0.295 | 0.310 | 20cd/m2 |
| 7500K | 0.300 | 0.315 | 20cd/m2 |

Note: Change COL.SELECT to 9300K, 9000K, 8500K, 8000K and 7500K, image color should be change to reddish.

One of three colors should be keep maximum "GAIN" in the all color temperatures.

- (8) Close menu.

5-5. Brightness Adjustment

Signal : No. 31 (VESA 1024*768@85Hz(Window)) White window pattern

Color : 9300K

- (1) Receive Signal 31 (White window pattern).
- (2) Turn the CA-100 into xyY mode.
- (3) Open Menu (F), TAG 1 " BRIGHTNESS " and set to 110.
- (4) Adjust "CONTRAST MAX" if Y value is more than 140 cd/m^2
Open Menu (F), TAG 1-2 " CONTRAST MAX. " and adjust so that its color analyzer indicated value is $140 \pm 5 \text{ cd/m}^2$ by "+", "-" SW. If Y value of color analyzer is less than 140 cd/m^2 , don't need to adjust CONTRAST MAX.
- (5) A version : Open Menu (F), TAG 7 "CONT PRESET" and set to "MAX" by "+" SW.
B version: Open Menu (F), TAG 7 "CONT PRESET" so that its color analyzer indicated value is $110 \pm 5 \text{ cd/m}^2$ by "+", "-" SW.
- (6) Close menu.

6. Focus Adjustment

Signal : Green "ㄢ" pattern and green vertical line inside Microsoft Excel "Work sheet"

No.20 (1024*768@85Hz) green and white "ㄢ" pattern, Red, green, blue and white cross hatch pattern

6-1 Picture Focus Adjustment

(1) Receive signal Microsoft Excel "Work sheet" by PC system.

The PC system recommend use the video card "Millennium II" or equivalent.

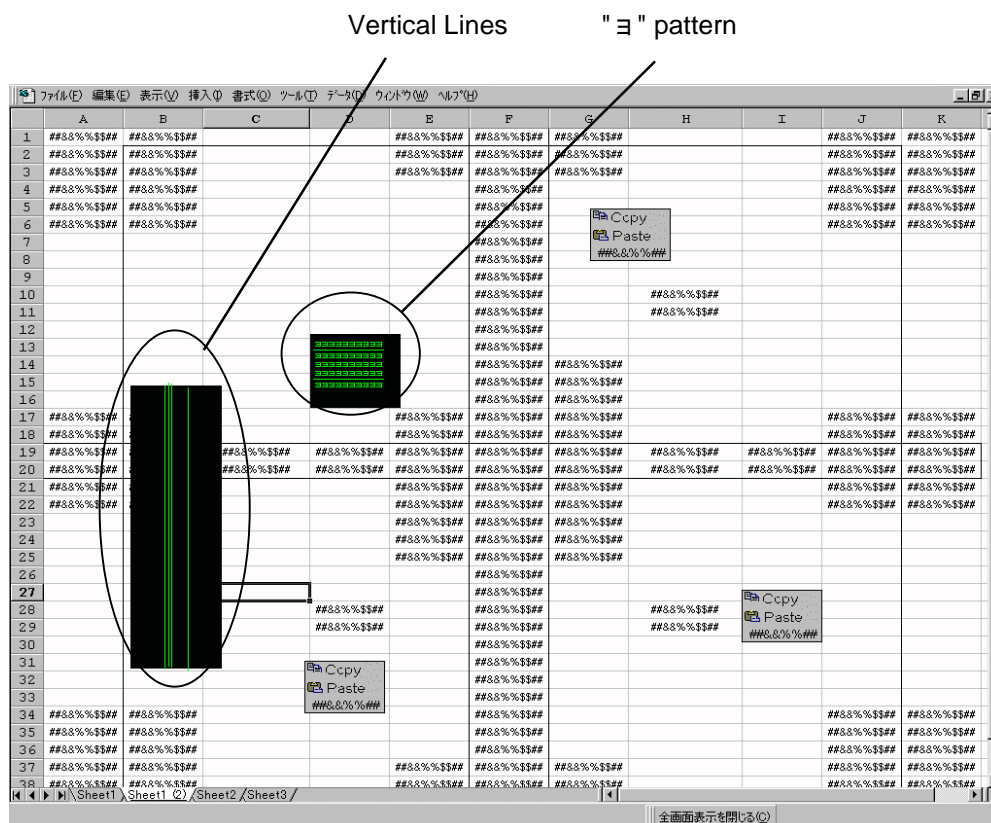


Fig 6-1 Microsoft Excel "work sheet"

(2) Set brightness to just cut off and contrast to user control maximum.

(3) Adjust VR F2 of FBT (Lower side VR) for the green vertical line in side of the excel sheet to become fine line.

(4) Adjust VR F1 of FBT (Upper side VR) for the green horizontal "ㄢ" pattern in side of the excel sheet to become fine line.

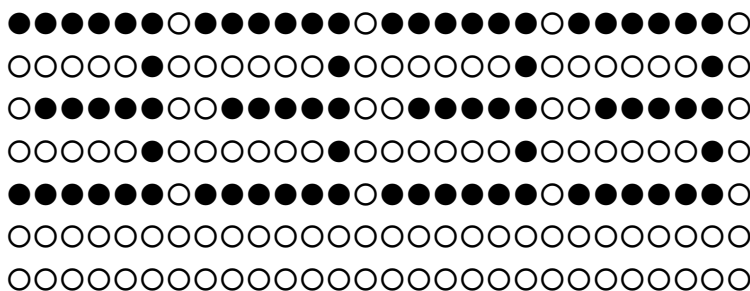


Fig 6-2 "ㄢ" pattern (Font size 7 x 9)

- (5) Receive signal 20 ,all green "ㄣ" pattern.
- (6) Make sure that the horizontal line of "ㄣ" can be seen separately at whole area of screen.
- (7) Repeat above inspection for white "ㄣ" patterns.
- (8) If this focus condition is bud, return to (1).
- (9) Receive Signal 20, all green cross hatch pattern.
- (10) The width of the vertical and horizontal lines should be meet to the following standard:

Vertical line : Less than 6 grills
Horizontal line : Core : Halo = 1 : less than 1.5

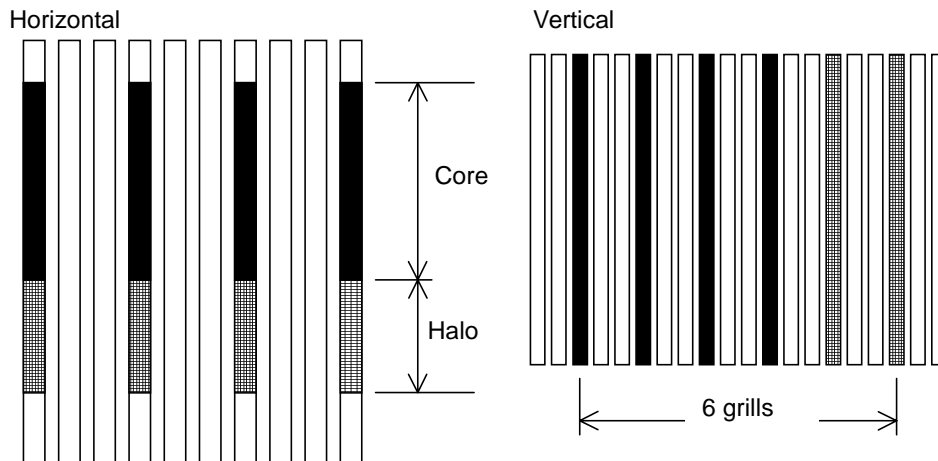


Fig 6-3 Halo

- (11) Repeat above inspection for Red and Blue cross hatch patterns.
- (12) If this Halo condition is bud, return to (1).

7. CRT Convergence

Signal : No. 33 (512*768@85Hz) Cross Hatch Pattern

- (1) The CRT face should be facing east and degauss the entire unit with an external degaussing coil.
- (2) Receive the cross hatch pattern of signal 33 and make sure that the screen size is following values :

H : 315 ± 8 mm V : 236 ± 8 mm

- (3) Measuring the misconvergence. If not with the following specification, adjust the static convergence by using the 4-pole / 6-pole magnets and some VRs on the CPM assembly.

$|x| \leq 0.32$ mm $|y| \leq 0.32$ mm

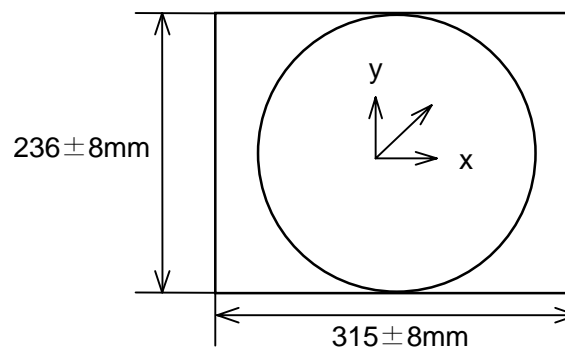
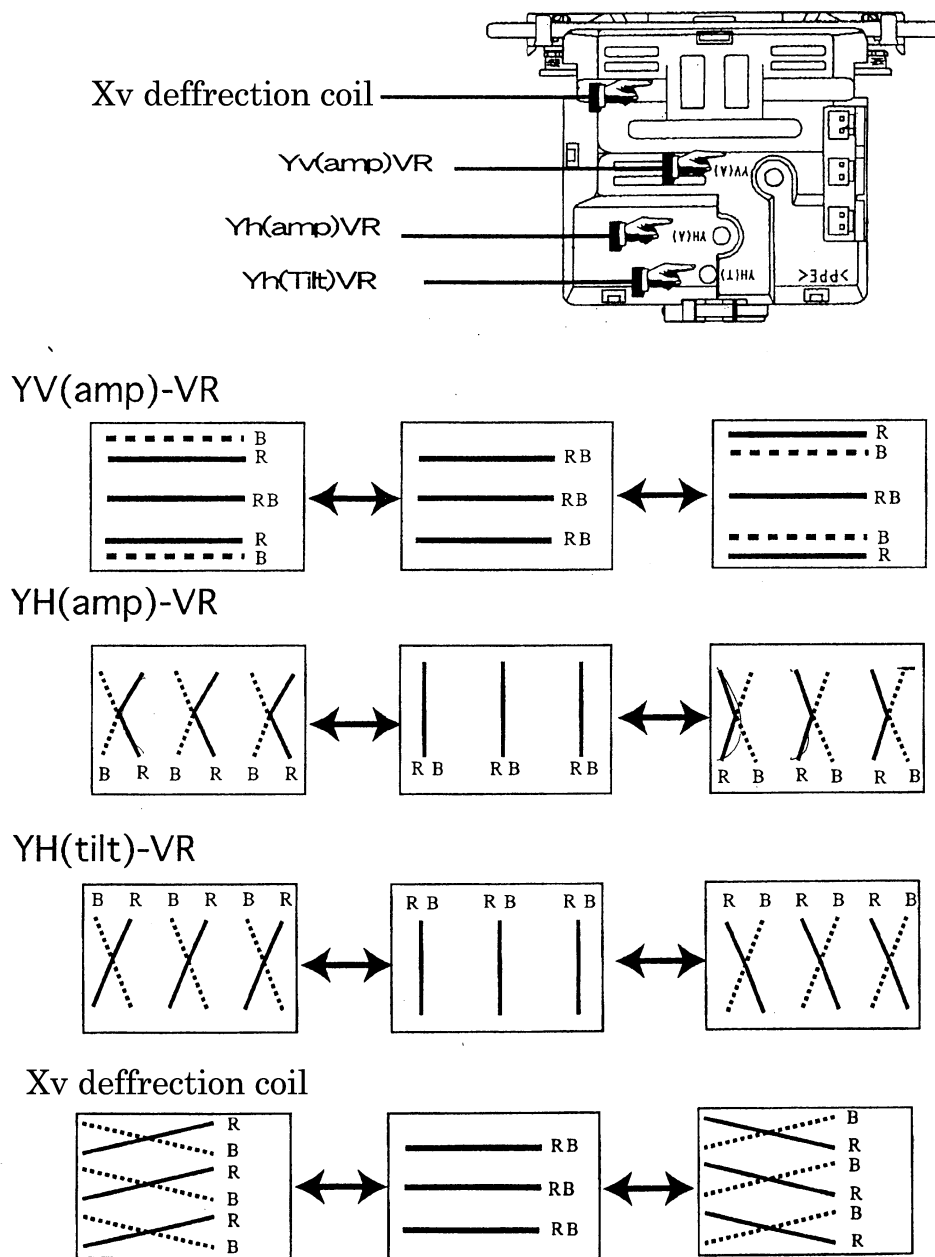


Fig 7-1 Convergence

M41LPE21X14 DY correction functions



8. OSD setting

(1) Open Menu (F), TAG 7 "INFORMATION" and set "DESTINATION" to following.

A version : USA

B version : EUR

[E] Reference

1. Adjustment / Inspection Signal

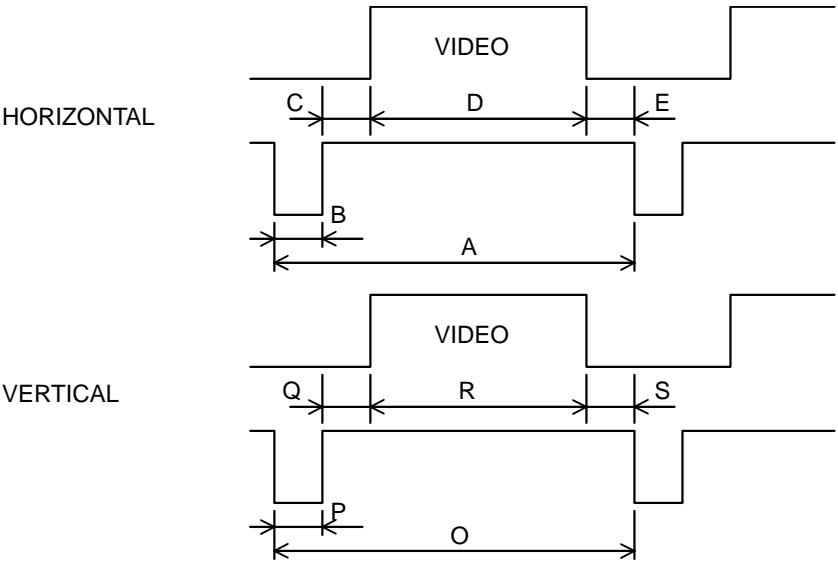
| NO | Signal Name | Video Signal | SYNC POLARITY (H/V) |
|----|---------------------|-------------------|---------------------------|
| 1 | VGA 350 | Video Signal 0.7V | H/V Separate P/N |
| 2 | VGA 400 | Video Signal 0.7V | H/V Separate N/P |
| 3 | VGA 480 | Video Signal 0.7V | H/V Separate N/N |
| 4 | 640*400@70Hz | Video Signal 0.7V | H/V Separate N/N |
| 5 | VESA 800*600@60Hz | Video Signal 0.7V | H/V Separate P/P |
| 6 | MAC 640*480 | Video Signal 0.7V | Composite Sync Signal N/N |
| 7 | VESA 350@85Hz | Video Signal 0.7V | H/V Separate P/N |
| 8 | VESA 400@85Hz | Video Signal 0.7V | H/V Separate N/P |
| 9 | VESA 640*480@75Hz | Video Signal 0.7V | H/V Separate N/N |
| 10 | XGA | Video Signal 0.7V | H/V Separate P/P |
| 11 | VESA 800*600@75Hz | Video Signal 0.7V | H/V Separate P/P |
| 12 | VESA 640*480@85Hz | Video Signal 0.7V | H/V Separate N/N |
| 13 | VESA 800*600@72Hz | Video Signal 0.7V | H/V Separate P/P |
| 14 | MAC 832*624 | Video Signal 0.7V | Composite Sync Signal N/N |
| 15 | VESA 800*600@85Hz | Video Signal 0.7V | H/V Separate P/P |
| 16 | VESA 1024*768@70Hz | Video Signal 0.7V | H/V Separate N/N |
| 17 | VESA 1024*768@75Hz | Video Signal 0.7V | H/V Separate P/P |
| 18 | VESA 1280*1024@60Hz | Video Signal 0.7V | H/V Separate P/P |
| 19 | MAC 1152*870@75Hz | Video Signal 0.7V | Composite Sync Signal N/N |
| 20 | VESA 1024*768@85Hz | Video Signal 0.7V | H/V Separate P/P |
| 28 | EDID | Video Signal 0.7V | H/V Separate N/N |
| 29 | VGA480(1/2) | Video Signal 0.7V | H/V Separate N/N |
| 30 | 31kHz/55Hz | Video Signal 0.7V | H/V Separate N/N |
| 31 | 1024*768@85Hz(WIN) | Video Signal 0.7V | H/V Separate P/P |
| 32 | 70kHz/120Hz | Video Signal 0.7V | H/V Separate P/P |
| 33 | 512*768@85Hz | Video Signal 0.7V | H/V Separate P/P |
| | | | |
| | | | |

| NO | Signal Name | Video Signal | SYNC POLARITY (H/V) |
|-----|--------------------|-------------------|---------------------|
| 101 | USER 2 | Video Signal 0.7V | H/V Separate P/P |
| 102 | VESA 800*600@56Hz | Video Signal 0.7V | H/V Separate P/P |
| 103 | USER 4 | Video Signal 0.7V | H/V Separate P/P |
| 104 | 1024*768@56Hz | Video Signal 0.7V | H/V Separate N/N |
| 105 | VESA 1024*768@60Hz | Video Signal 0.7V | H/V Separate N/N |
| 106 | USER 7 | Video Signal 0.7V | H/V Separate N/N |
| 107 | 800*600@80Hz | Video Signal 0.7V | H/V Separate P/P |
| 108 | 640*480@100Hz | Video Signal 0.7V | H/V Separate N/N |
| 109 | 1024*768@72Hz | Video Signal 0.7V | H/V Separate P/P |
| 110 | USER 11 | Video Signal 0.7V | H/V Separate N/N |
| 111 | 1152*864@70Hz | Video Signal 0.7V | H/V Separate P/P |
| 112 | VESA 1600*1200(I) | Video Signal 0.7V | H/V Separate P/P |
| 113 | 640*480@120Hz | Video Signal 0.7V | H/V Separate N/N |
| 114 | MAC 1152*870 | Video Signal 0.7V | H/V Separate N/N |
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※Cross hatch pattern consist of the 17 vertical lines and the 13 horizontal lines.

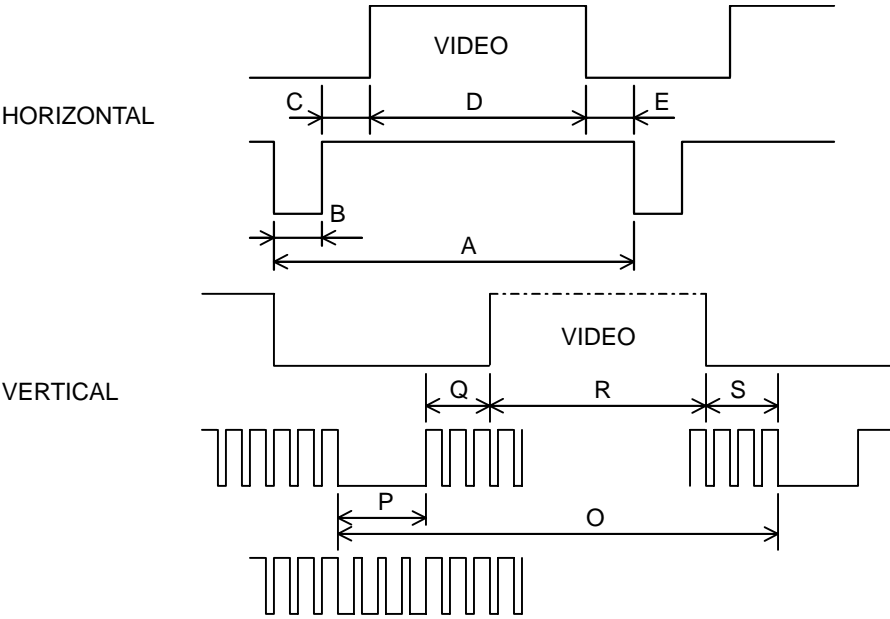
2. Signal Timing Charts

SEPARATE SYNC



Sync Polarity : Positive/Negative

COMPOSITE SYNC



Sync Polarity : Positive/Negative

Adjustment / Inspection Signal (1)

| | PROGRAM NO. | 1 | 2 | 3 | 4 | 5 |
|---|----------------------|---------|---------|---------|--------------------------|--------------------------|
| | SIGNAL NAME | VGA350 | VGA400 | VGA480 | PC98 640*400 @70Hz | VESA 800*600 @60Hz |
| | RESOLUTION | 720*350 | 720*400 | 640*480 | 640*400 | 800*600 |
| | DOT CLOCK (MHz) | 28.322 | 28.322 | 25.175 | 25.175 | 40 |
| | fh (kHz) | 31.47 | 31.47 | 31.47 | 31.469 | 37.879 |
| | fv (Hz) | 70.09 | 70.09 | 59.94 | 70.086 | 60.317 |
| H | CELL SIZE (DOT) | 9 | 9 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 900 | 900 | 800 | 800 | 1056 |
| | (CHR) | 100 | 100 | 100 | 100 | 132 |
| | (μ S) | 31.78 | 31.78 | 31.78 | 31.778 | 26.40 |
| | (D) DISP (DOT) | 720 | 720 | 640 | 640 | 800 |
| | (CHR) | 80 | 80 | 80 | 80 | 100 |
| | (μ S) | 25.42 | 25.42 | 25.42 | 25.422 | 20.00 |
| V | (E) FRONT (DOT) | 18 | 18 | 16 | 17 | 40 |
| | (μ S) | 0.64 | 0.64 | 0.64 | 0.675 | 1.00 |
| | (B) SYNC PULSE (DOT) | 108 | 108 | 96 | 64 | 128 |
| | (μ S) | 3.81 | 3.81 | 3.81 | 2.542 | 3.20 |
| | (C) BACK (DOT) | 54 | 54 | 48 | 79 | 88 |
| | (μ S) | 1.91 | 1.91 | 1.91 | 3.138 | 2.20 |
| | CELL SIZE (H) | 14 | 16 | 16 | 16 | 15 |
| | (O) TOTAL (H) | 449 | 449 | 525 | 449 | 628 |
| | (mS) | 14.268 | 14.268 | 16.683 | 14.268 | 16.579 |
| | (R) DISP (H) | 350 | 400 | 480 | 400 | 600 |
| | (CHR) | 25 | 25 | 30 | 25 | 40 |
| | (mS) | 11.122 | 12.711 | 15.253 | 12.711 | 15.840 |
| | (F) FRONT (H) | 37 | 12 | 10 | 13 | 1 |
| | (mS) | 1.176 | 0.381 | 0.318 | 0.413 | 0.0260 |
| | (P) SYNC PULSE (H) | 2 | 2 | 2 | 2 | 4 |
| | (mS) | 0.064 | 0.064 | 0.064 | 0.064 | 0.106 |
| | (Q) BACK (H) | 60 | 35 | 33 | 34 | 23 |
| | (mS) | 1.907 | 1.112 | 1.049 | 1.080 | 0.607 |
| | INTERLACE | NON | NON | NON | NON | NON |
| | POLARITY (H/V) | POS/NEG | NEG/POS | NEG/NEG | NEG/NEG | POS/POS |
| | COMPOSITE SYNC | — | — | — | — | — |
| | COMPOSITE VIDEO | — | — | — | — | — |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | OFF | OFF | OFF | OFF | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (2)

| | | | | | | |
|---|----------------------|----------------|----------------------|----------------------|--------------------------|----------|
| | PROGRAM NO. | 6 | 7 | 8 | 9 | 10 |
| | SIGNAL NAME | MAC 640*480 | VESA 350 @85Hz | VESA 400 @85Hz | VESA 640*480 @75Hz | XGA |
| | RESOLUTION | 640*480 | 640*350 | 640*400 | 640*480 | 1024*768 |
| | DOT CLOCK (MHz) | 30.24 | 31.5 | 31.5 | 31.5 | 44.9 |
| | fh (kHz) | 35.00 | 37.86 | 37.861 | 37.5 | 35.52 |
| | fv (Hz) | 66.67 | 85.08 | 85.080 | 75.00 | 86.96 |
| H | CELL SIZE (DOT) | 8 | 8 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 864 | 832 | 832 | 840 | 1264 |
| | (CHR) | 108 | 104 | 104 | 105 | 158 |
| | (μ S) | 28.57 | 26.413 | 26.413 | 26.67 | 28.15 |
| | (D) DISP (DOT) | 640 | 640 | 640 | 640 | 1024 |
| | (CHR) | 80 | 80 | 80 | 80 | 128 |
| | (μ S) | 21.16 | 20.32 | 20.317 | 20.32 | 22.81 |
| | (E) FRONT (DOT) | 64 | 32 | 32 | 16 | 8 |
| | (μ S) | 2.12 | 1.016 | 1.016 | 0.51 | 0.18 |
| | (B) SYNC PULSE (DOT) | 64 | 64 | 64 | 64 | 176 |
| | (μ S) | 2.12 | 2.032 | 2.032 | 2.03 | 3.92 |
| | (C) BACK (DOT) | 96 | 96 | 96 | 120 | 56 |
| | (μ S) | 3.17 | 3.048 | 3.048 | 3.81 | 1.25 |
| V | CELL SIZE (H) | 16 | 14 | 16 | 16 | 16 |
| | (O) TOTAL (H) | 525 | 445 | 445 | 500 | 408.5 |
| | (mS) | 15.000 | 11.754 | 11.754 | 13.333 | 11.500 |
| | (R) DISP (H) | 480 | 350 | 400 | 480 | 384 |
| | (CHR) | 30 | 25 | 25 | 30 | 24 |
| | (mS) | 13.714 | 9.244 | 10.565 | 12.800 | 10.810 |
| | (F) FRONT (H) | 3 | 32 | 1 | 1 | 0 |
| | (mS) | 0.086 | 0.845 | 0.026 | 0.027 | 0.000 |
| | (P) SYNC PULSE (H) | 3 | 3 | 3 | 3 | 4 |
| | (mS) | 0.086 | 0.079 | 0.079 | 0.080 | 0.113 |
| | (Q) BACK (H) | 39 | 60 | 41 | 16 | 20 |
| | (mS) | 1.114 | 1.585 | 1.083 | 0.427 | 0.563 |
| | INTERLACE | NON | NON | NON | NON | S&Video |
| | POLARITY (H/V) | NEG/NEG | POS/NEG | NEG/POS | NEG/NEG | POS/POS |
| | COMPOSITE SYNC | NEG | — | — | — | — |
| | COMPOSITE VIDEO | — | — | — | — | — |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | ON | OFF | OFF | OFF | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (3)

| | | | | | | |
|---|----------------------|--------------------------|--------------------------|--------------------------|----------------|--------------------------|
| | PROGRAM NO. | 11 | 12 | 13 | 14 | 15 |
| | SIGNAL NAME | VESA 800*600 @75Hz | VESA 640*480 @85Hz | VESA 800*600 @72Hz | MAC 832*624 | VESA 800*600 @85Hz |
| | RESOLUTION | 800*600 | 640*480 | 800*600 | 832*624 | 800*600 |
| | DOT CLOCK (MHz) | 49.5 | 36 | 50 | 57.283 | 56.25 |
| | fh (kHz) | 46.875 | 43.27 | 48.077 | 49.72 | 53.67 |
| | fv (Hz) | 75.00 | 85.01 | 72.188 | 74.55 | 85 |
| H | CELL SIZE (DOT) | 8 | 8 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 1056 | 832 | 1040 | 1152 | 1048 |
| | (CHR) | 132 | 104 | 130 | 144 | 131 |
| | (uS) | 21.33 | 23.11 | 20.8 | 20.11 | 18.63 |
| | (D) DISP (DOT) | 800 | 640 | 800 | 832 | 800 |
| | (CHR) | 100 | 80 | 100 | 104 | 100 |
| | (uS) | 16.162 | 17.78 | 16 | 14.52 | 14.22 |
| | (E) FRONT (DOT) | 16 | 56 | 56 | 32 | 32 |
| | (uS) | 0.323 | 1.556 | 1.12 | 0.56 | 0.57 |
| | (B) SYNC PULSE (DOT) | 80 | 56 | 120 | 64 | 64 |
| | (uS) | 1.616 | 1.556 | 2.4 | 1.12 | 1.14 |
| | (C) BACK (DOT) | 160 | 80 | 64 | 224 | 152 |
| | (uS) | 3.232 | 2.222 | 1.28 | 3.91 | 2.70 |
| V | CELL SIZE (H) | 15 | 16 | 15 | 16 | 15 |
| | (O) TOTAL (H) | 625 | 509 | 666 | 667 | 631 |
| | (mS) | 13.333 | 11.764 | 13.853 | 13.414 | 11.756 |
| | (R) DISP (H) | 600 | 480 | 600 | 624 | 600 |
| | (CHR) | 40 | 30 | 40 | 39 | 40 |
| | (mS) | 12.800 | 11.093 | 12.48 | 12.549 | 11.179 |
| | (F) FRONT (H) | 1 | 1 | 37 | 1 | 1 |
| | (mS) | 0.021 | 0.023 | 0.770 | 0.020 | 0.019 |
| | (P) SYNC PULSE (H) | 3 | 3 | 6 | 3 | 3 |
| | (mS) | 0.064 | 0.069 | 0.125 | 0.060 | 0.056 |
| | (Q) BACK (H) | 21 | 25 | 23 | 39 | 27 |
| | (mS) | 0.448 | 0.578 | 0.478 | 0.784 | 0.503 |
| | INTERLACE | NON | NON | NON | NON | NON |
| | POLARITY (H/V) | POS/POS | NEG/NEG | POS/POS | NEG/NEG | POS/POS |
| | COMPOSITE SYNC | — | — | — | NEG | — |
| | COMPOSITE VIDEO | — | — | — | — | — |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | OFF | OFF | OFF | ON | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (4)

| | | | | | | |
|---|----------------------|---------------------------|---------------------------|----------------------------|-----------------|---------------------------|
| | PROGRAM NO. | 16 | 17 | 18 | 19 | 20 |
| | SIGNAL NAME | VESA 1024*768 @70Hz | VESA 1024*768 @75Hz | VESA 1280*1024 @60Hz | MAC 1152*870 | VESA 1024*768 @85Hz |
| | RESOLUTION | 1024*768 | 1024*768 | 1280*1024 | 1152*870 | 1024*768 |
| | DOT CLOCK (MHz) | 75 | 78.75 | 108 | 100 | 94.5 |
| | fh (kHz) | 56.48 | 60.02 | 63.98 | 68.681 | 68.68 |
| | fv (Hz) | 70.07 | 75.03 | 60.02 | 75.062 | 85.00 |
| H | CELL SIZE (DOT) | 8 | 8 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 1328 | 1312 | 1688 | 1456 | 1376 |
| | (CHR) | 166 | 164 | 211 | 182 | 172 |
| | (uS) | 17.71 | 16.66 | 15.63 | 14.560 | 14.560 |
| | (D) DISP (DOT) | 1024 | 1024 | 1280 | 1152 | 1024 |
| | (CHR) | 128 | 128 | 160 | 144 | 128 |
| | (uS) | 13.65 | 13.00 | 11.85 | 11.52 | 10.836 |
| | (E) FRONT (DOT) | 24 | 16 | 48 | 32 | 48 |
| | (uS) | 0.32 | 0.203 | 0.44 | 0.320 | 0.508 |
| | (B) SYNC PULSE (DOT) | 136 | 96 | 112 | 128 | 96 |
| | (uS) | 1.81 | 1.219 | 1.04 | 1.28 | 1.016 |
| | (C) BACK (DOT) | 144 | 176 | 248 | 144 | 208 |
| | (uS) | 1.92 | 2.235 | 2.30 | 1.440 | 2.201 |
| V | CELL SIZE (H) | 16 | 16 | 16 | 15 | 16 |
| | (O) TOTAL (H) | 806 | 800 | 1066 | 915 | 808 |
| | (mS) | 14.272 | 13.328 | 16.661 | 13.322 | 11.765 |
| | (R) DISP (H) | 768 | 768 | 1024 | 870 | 768 |
| | (CHR) | 48 | 48 | 64 | 58 | 48 |
| | (mS) | 13.599 | 12.795 | 16.005 | 12.677 | 11.183 |
| | (F) FRONT (H) | 3 | 1 | 1 | 3 | 1 |
| | (mS) | 0.053 | 0.017 | 0.016 | 0.044 | 0.015 |
| | (P) SYNC PULSE (H) | 6 | 3 | 3 | 3 | 3 |
| | (mS) | 0.106 | 0.050 | 0.047 | 0.044 | 0.044 |
| | (Q) BACK (H) | 29 | 28 | 38 | 39 | 36 |
| | (mS) | 0.513 | 0.466 | 0.594 | 0.568 | 0.524 |
| | INTERLACE | NON | NON | NON | NON | NON |
| | POLARITY (H/V) | NEG/NEG | POS/POS | POS/POS | NEG/NEG | POS/POS |
| | COMPOSITE SYNC | — | — | — | NEG | — |
| | COMPOSITE VIDEO | — | — | — | — | — |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | OFF | OFF | OFF | ON | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (5)

| | | | | | | |
|---|----------------------|---------|-----------------|----------------|--------------------------|-----------------|
| | PROGRAM NO. | 28 | 29 | 30 | 31 | 32 |
| | SIGNAL NAME | EDID | VGA480 (1/2) | 31kHz/ 55Hz | 1024*768 @85 (WIN) | 70kHz/ 120Hz |
| | RESOLUTION | 720*685 | 640*240 | 640*480 | 1024*768 | 1024*768 |
| | DOT CLOCK (MHz) | 28.322 | 25.175 | 24.80 | 94.50 | 96.32 |
| | fh (kHz) | 31.47 | 31.47 | 31.00 | 68.68 | 70.00 |
| | fv (Hz) | 42.01 | 59.94 | 55.0 | 85.0 | 120.0 |
| H | CELL SIZE (DOT) | 9 | 8 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 900 | 800 | 800 | 1376 | 1376 |
| | (CHR) | 100 | 100 | 100 | 172 | 172 |
| | (uS) | 31.78 | 31.78 | 32.26 | 14.56 | 14.286 |
| | (D) DISP (DOT) | 720 | 640 | 640 | 288 | 1024 |
| | (CHR) | 80 | 80 | 80 | 36 | 128 |
| | (uS) | 25.42 | 25.42 | 25.81 | 3.047 | 10.63 |
| | (E) FRONT (DOT) | 18 | 16 | 16 | 411 | 48 |
| | (uS) | 0.64 | 0.64 | 0.65 | 4.349 | 0.498 |
| | (B) SYNC PULSE (DOT) | 108 | 96 | 96 | 96 | 96 |
| | (uS) | 3.81 | 3.81 | 3.87 | 1.016 | 0.997 |
| | (C) BACK (DOT) | 54 | 48 | 48 | 581 | 208 |
| | (uS) | 1.906 | 1.91 | 1.94 | 6.148 | 2.159 |
| V | CELL SIZE (H) | 14 | 16 | 16 | 16 | 16 |
| | (O) TOTAL (H) | 749 | 525 | 564 | 808 | 583 |
| | (mS) | 23.80 | 16.683 | 18.194 | 11.765 | 8.329 |
| | (R) DISP (H) | 685 | 240 | 480 | 272 | 480 |
| | (CHR) | 48.93 | 15 | 30 | 17 | 30 |
| | (mS) | 21.77 | 7.627 | 15.484 | 3.960 | 6.857 |
| | (F) FRONT (H) | 14 | 10 | 49 | 252 | 1 |
| | (mS) | 0.44 | 0.318 | 1.580 | 3.669 | 0.014 |
| | (P) SYNC PULSE (H) | 3 | 2 | 2 | 3 | 3 |
| | (mS) | 0.095 | 0.064 | 0.065 | 0.044 | 0.043 |
| | (Q) BACK (H) | 47 | 273 | 33 | 281 | 99 |
| | (mS) | 1.494 | 8.675 | 1.065 | 4.092 | 1.414 |
| | INTERLACE | NON | NON | NON | NON | NON |
| | POLARITY (H/V) | NEG/NEG | NEG/NEG | NEG/NEG | POS/POS | POS/POS |
| | COMPOSITE SYNC | — | — | — | - | — |
| | COMPOSITE VIDEO | — | — | — | - | — |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | OFF | OFF | OFF | OFF | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (6)

| | | | | | | |
|---|----------------------------------|---------------------|--|--|--|--|
| | PROGRAM NO. | 33 | | | | |
| | SIGNAL NAME | 512*768@ 85Hz | | | | |
| | RESOLUTION | 512*768 | | | | |
| | DOT CLOCK (MHz) | 47.25 | | | | |
| | fh (kHz) | 68.68 | | | | |
| | fv (Hz) | 85.00 | | | | |
| H | CELL SIZE (DOT) | 8 | | | | |
| | (A) TOTAL (DOT) (CHR) (uS) | 688 86 14.560 | | | | |
| | (D) DISP (DOT) (CHR) (uS) | 512 64 10.836 | | | | |
| | (E) FRONT (DOT) (uS) | 24 0.508 | | | | |
| | (B) SYNC PULSE (DOT) (uS) | 48 1.016 | | | | |
| | (C) BACK (DOT) (uS) | 104 2.201 | | | | |
| V | CELL SIZE (H) | 16 | | | | |
| | (O) TOTAL (H) (mS) | 808 11.765 | | | | |
| | (R) DISP (H) (CHR) (mS) | 768 48 11.183 | | | | |
| | (F) FRONT (H) (mS) | 1 0.015 | | | | |
| | (P) SYNC PULSE (H) (mS) | 3 0.044 | | | | |
| | (Q) BACK (H) (mS) | 36 0.524 | | | | |
| | INTERLACE | NON | | | | |
| | POLARITY (H/V) | POS/POS | | | | |
| | COMPOSITE SYNC | — | | | | |
| | COMPOSITE VIDEO | — | | | | |
| | CHARACTER FONT | 7*9 | | | | |
| | SERRATION | OFF | | | | |
| | EQP | OFF | | | | |

Adjustment / Inspection Signal (7)

| | PROGRAM NO. | 101 | 102 | 103 | 104 | 105 |
|---|----------------------|---------|--------------------------|---------|-------------------|---------------------------|
| | SIGNAL NAME | USER 2 | VESA 800*600 @56Hz | USER 4 | 1024*768 @56Hz | VESA 1024*768 @60Hz |
| | RESOLUTION | 640*400 | 800*600 | 640*480 | 1024*768 | 1024*768 |
| | DOT CLOCK (MHz) | 25.175 | 36.000 | 31.500 | 60.490 | 65.000 |
| | fh (kHz) | 31.47 | 35.16 | 37.50 | 45.01 | 48.36 |
| | fv (Hz) | 70.09 | 56.25 | 75.00 | 55.98 | 60.00 |
| H | CELL SIZE (DOT) | 8 | 8 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 800 | 1024 | 840 | 1344 | 1344 |
| | (CHR) | 100 | 128 | 105 | 168 | 168 |
| | (uS) | 31.78 | 28.44 | 26.67 | 22.22 | 20.67 |
| | (D) DISP (DOT) | 640 | 800 | 640 | 1024 | 1024 |
| | (CHR) | 80 | 100 | 80 | 128 | 128 |
| | (uS) | 25.42 | 22.22 | 20.32 | 16.93 | 15.75 |
| | (E) FRONT (DOT) | 16 | 24 | 16 | 24 | 24 |
| | (uS) | 0.64 | 0.67 | 0.51 | 0.40 | 0.37 |
| | (B) SYNC PULSE (DOT) | 96 | 72 | 64 | 136 | 136 |
| V | (uS) | 3.81 | 2.00 | 2.03 | 2.25 | 2.09 |
| | (C) BACK (DOT) | 48 | 128 | 120 | 160 | 160 |
| | (uS) | 1.91 | 3.56 | 3.81 | 2.65 | 2.46 |
| | CELL SIZE (H) | 16 | 16 | 16 | 16 | 16 |
| | (O) TOTAL (H) | 449 | 625 | 500 | 804 | 806 |
| | (mS) | 14.268 | 17.778 | 13.333 | 17.864 | 16.666 |
| | (R) DISP (H) | 400 | 600 | 480 | 768 | 768 |
| | (CHR) | 25 | 37.5 | 30 | 48 | 48 |
| | (mS) | 12.711 | 17.067 | 12.800 | 17.064 | 15.880 |
| | (F) FRONT (H) | 12 | 1 | 1 | 1 | 3 |
| | (mS) | 0.381 | 0.028 | 0.027 | 0.022 | 0.062 |
| | (P) SYNC PULSE (H) | 2 | 2 | 3 | 6 | 6 |
| | (mS) | 0.064 | 0.057 | 0.080 | 0.133 | 0.124 |
| | (Q) BACK (H) | 35 | 22 | 16 | 29 | 29 |
| | (mS) | 1.112 | 0.626 | 0.427 | 0.644 | 0.600 |
| | INTERLACE | NON | NON | NON | NON | NON |
| | POLARITY (H/V) | POS/POS | POS/POS | POS/POS | NEG/NEG | NEG/NEG |
| | COMPOSITE SYNC | | | | | |
| | COMPOSITE VIDEO | | | | | |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | OFF | OFF | OFF | OFF | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (8)

| | | | | | | |
|---|----------------------|---------|------------------|-------------------|-------------------|---------|
| | PROGRAM NO. | 106 | 107 | 108 | 109 | 110 |
| | SIGNAL NAME | USER 7 | 800*600 @80Hz | 640*480 @100Hz | 1024*768 @72Hz | USER11 |
| | RESOLUTION | 832*542 | 800*600 | 640*480 | 1024*768 | 640*480 |
| | DOT CLOCK (MHz) | 57.283 | 54.500 | 45 | 79.000 | 50 |
| | fh (kHz) | 49.72 | 52.00 | 53.066 | 58.09 | 58.96 |
| | fv (Hz) | 84.99 | 80.01 | 100.504 | 71.98 | 111.67 |
| H | CELL SIZE (DOT) | 8 | 8 | 8 | 8 | 8 |
| | (A) TOTAL (DOT) | 1152 | 1048 | 848 | 1360 | 848 |
| | (CHR) | 144 | 131 | 106 | 170 | 106 |
| | (uS) | 20.11 | 19.23 | 18.844 | 17.22 | 16.96 |
| | (D) DISP (DOT) | 832 | 800 | 640 | 1024 | 640 |
| | (CHR) | 104 | 100 | 80 | 128 | 80 |
| | (uS) | 14.52 | 14.68 | 14.22 | 12.96 | 12.8 |
| | (E) FRONT (DOT) | 32 | 8 | 32 | 8 | 32 |
| | (uS) | 0.56 | 0.15 | 0.711 | 0.10 | 0.64 |
| | (B) SYNC PULSE (DOT) | 64 | 80 | 64 | 288 | 64 |
| | (uS) | 1.12 | 1.47 | 1.422 | 3.65 | 1.28 |
| | (C) BACK (DOT) | 224 | 160 | 112 | 40 | 112 |
| | (uS) | 3.91 | 2.94 | 2.489 | 0.51 | 2.24 |
| V | CELL SIZE (H) | 16 | 16 | 16 | 16 | 16 |
| | (O) TOTAL (H) | 585 | 650 | 528 | 807 | 528 |
| | (mS) | 11.766 | 12.449 | 9.95 | 13.89 | 8.95 |
| | (R) DISP (H) | 542 | 600 | 480 | 768 | 480 |
| | (CHR) | 33 | 37.5 | 30 | 48 | 30 |
| | (mS) | 10.901 | 11.538 | 9.045 | 13.221 | 8.14 |
| | (F) FRONT (H) | 1 | 26 | 4 | 0 | 4 |
| | (mS) | 0.020 | 0.500 | 0.075 | 0 | 0.068 |
| | (P) SYNC PULSE (H) | 3 | 3 | 4 | 8 | 4 |
| | (mS) | 0.060 | 0.058 | 0.075 | 0.138 | 0.068 |
| | (Q) BACK (H) | 39 | 21 | 40 | 31 | 40 |
| | (mS) | 0.784 | 0.404 | 0.754 | 0.534 | 0.678 |
| | INTERLACE | NON | NON | NON | NON | NON |
| | POLARITY (H/V) | NEG/NEG | POS/POS | NEG/NEG | POS/POS | NEG/NEG |
| | COMPOSITE SYNC | | | | | |
| | COMPOSITE VIDEO | | | | | |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | 7*9 |
| | SERRATION | OFF | OFF | OFF | OFF | OFF |
| | EQP | OFF | OFF | OFF | OFF | OFF |

Adjustment / Inspection Signal (9)

| | | | | | | |
|---|----------------------|-------------------|--------------------------|-------------------|-----------------|--|
| | PROGRAM NO. | 111 | 112 | 113 | 114 | |
| | SIGNAL NAME | 1152*864 @70Hz | VESA 1600*1200 (i) | 640*480 @120Hz | MAC 1152*870 | |
| | RESOLUTION | 1152*864 | 1660*1200 | 640*480 | 1152*870 | |
| | DOT CLOCK (MHz) | 94.500 | 135.000 | 54.000 | 100.000 | |
| | fh (kHz) | 63.85 | 62.50 | 63.68 | 68.68 | |
| | fv (Hz) | 70.01 | 96.15 | 120.61 | 75.06 | |
| H | CELL SIZE (DOT) | 8 | 8 | 8 | 8 | |
| | (A) TOTAL (DOT) | 1480 | 2160 | 848 | 1456 | |
| | (CHR) | 185 | 270 | 106 | 182 | |
| | (uS) | 15.66 | 16.00 | 15.70 | 14.56 | |
| | (D) DISP (DOT) | 1152 | 1600 | 640 | 1152 | |
| | (CHR) | 144 | 200 | 80 | 144 | |
| | (uS) | 12.19 | 11.85 | 11.85 | 11.52 | |
| | (E) FRONT (DOT) | 32 | 48 | 32 | 32 | |
| | (uS) | 0.34 | 0.36 | 0.59 | 0.32 | |
| | (B) SYNC PULSE (DOT) | 96 | 192 | 64 | 128 | |
| | (uS) | 1.02 | 1.42 | 1.19 | 1.28 | |
| | (C) BACK (DOT) | 200 | 320 | 112 | 144 | |
| | (uS) | 2.12 | 2.37 | 2.07 | 1.44 | |
| V | CELL SIZE (H) | 16 | 16 | 16 | 16 | |
| | (O) TOTAL (H) | 912 | 650 | 528 | 915 | |
| | (mS) | 14.283 | 10.400 | 8.292 | 13.322 | |
| | (R) DISP (H) | 864 | 600 | 480 | 870 | |
| | (CHR) | 54 | 37.5 | 30 | 54.375 | |
| | (mS) | 13.531 | 9.600 | 7.538 | 12.667 | |
| | (F) FRONT (H) | 1 | 1 | 2 | 3 | |
| | (mS) | 0.016 | 0.016 | 0.031 | 0.044 | |
| | (P) SYNC PULSE (H) | 3 | 3 | 4 | 3 | |
| | (mS) | 0.047 | 0.048 | 0.063 | 0.044 | |
| | (Q) BACK (H) | 44 | 46 | 42 | 39 | |
| | (mS) | 0.689 | 0.736 | 0.660 | 0.568 | |
| | INTERLACE | NON | S&VIDEO | NON | NON | |
| | POLARITY (H/V) | POS/POS | POS/POS | NEG/NEG | NEG/NEG | |
| | COMPOSITE SYNC | | | | | |
| | COMPOSITE VIDEO | | | | | |
| | CHARACTER FONT | 7*9 | 7*9 | 7*9 | 7*9 | |
| | SERRATION | OFF | OFF | OFF | OFF | |
| | EQP | OFF | OFF | OFF | OFF | |

3. Position of Connector ,Test point ,Adjustment and Inspection

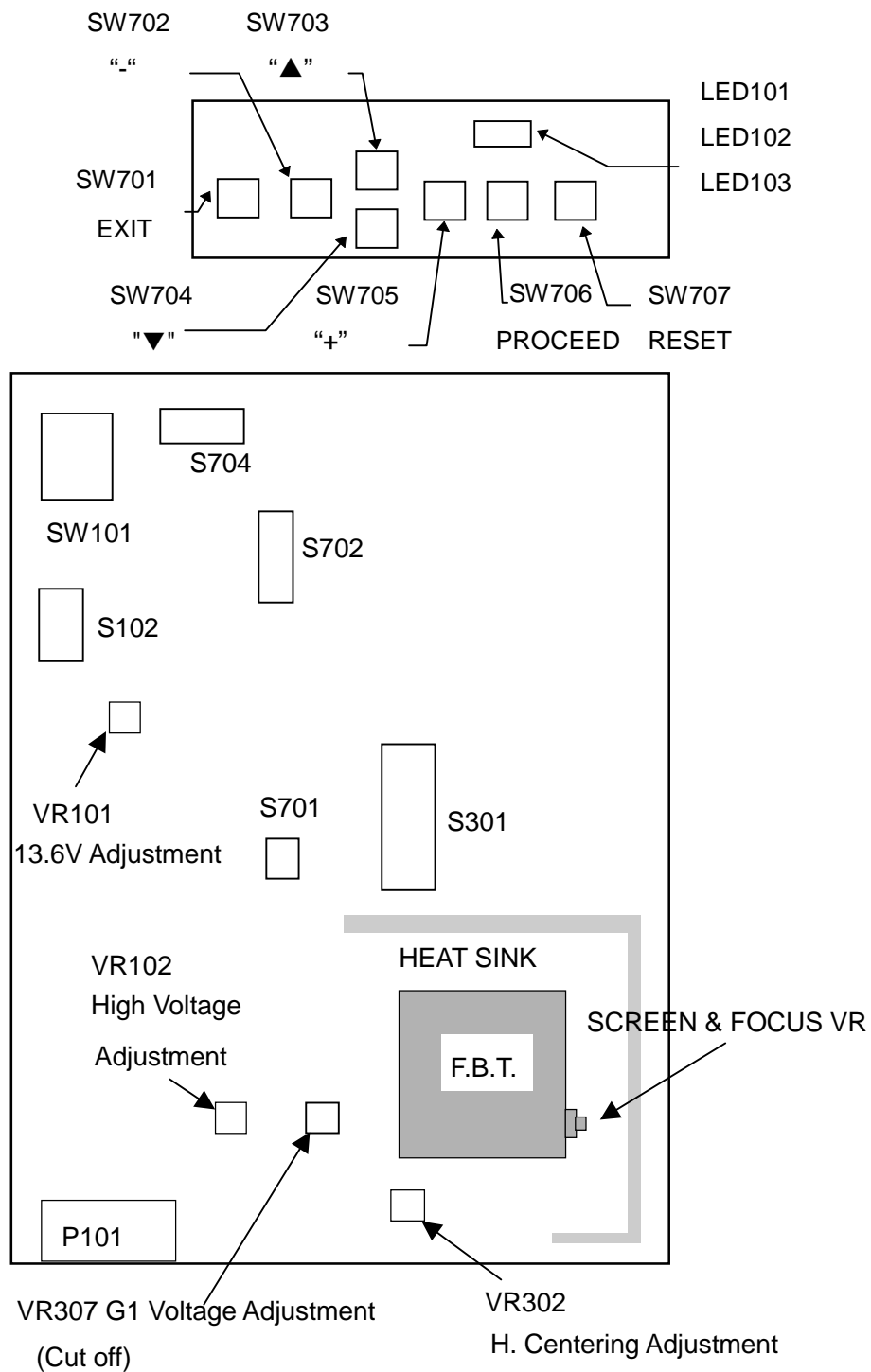


Fig 3-1 MAIN PWB (Parts Side)

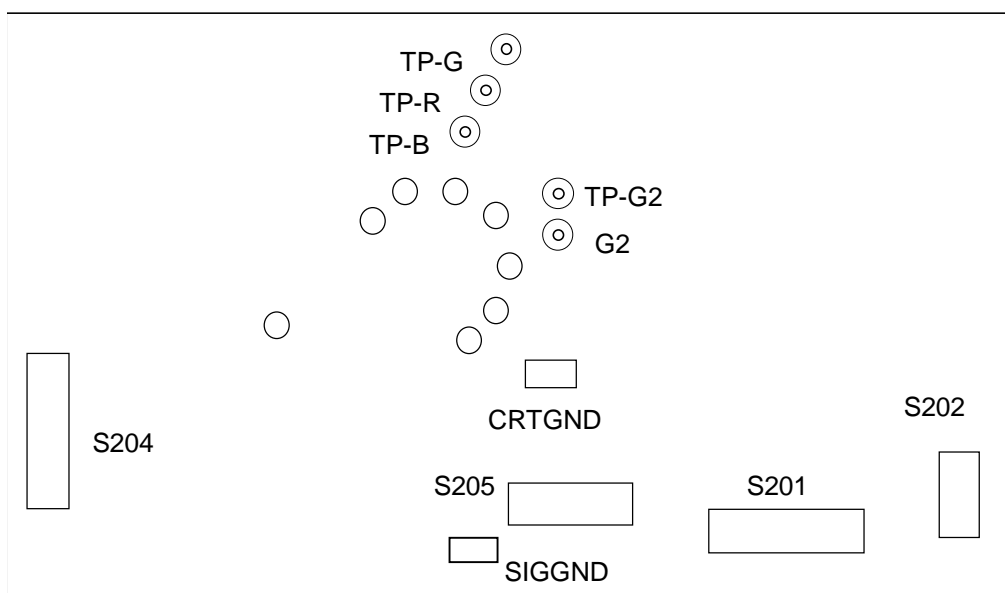


Fig 3-2 CRT PWB (Parts Side)

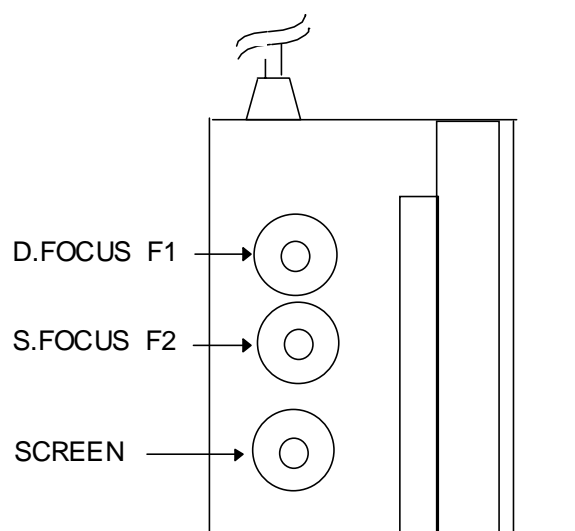


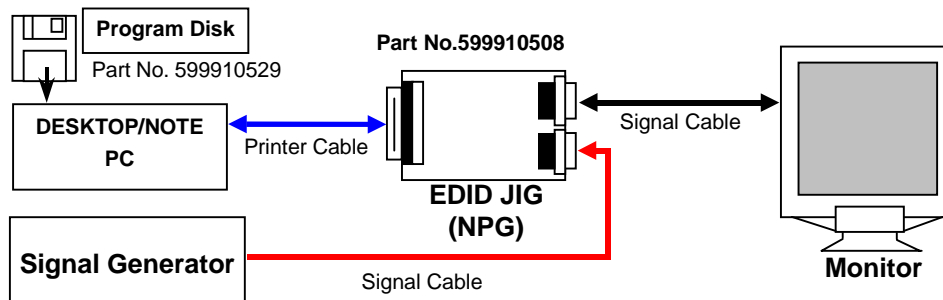
Fig 3-3 F.B.T. (T301) VR

INSPECTION

1. Inspection of PLUG & PLAY communication and OSM "MONITOR INFORMATION" for model name/ serial number

1-1. A construction of System

This system should be connected as shown below.



1-2. Input signal

Horizontal sync frequency: Not specified.

Vertical sync frequency: Not specified.

1-3. Programs required

CN8701.EXE
FE700VE.BAT
FE700VE.TXT

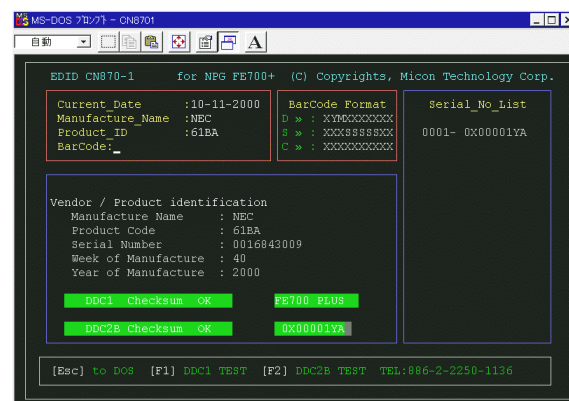
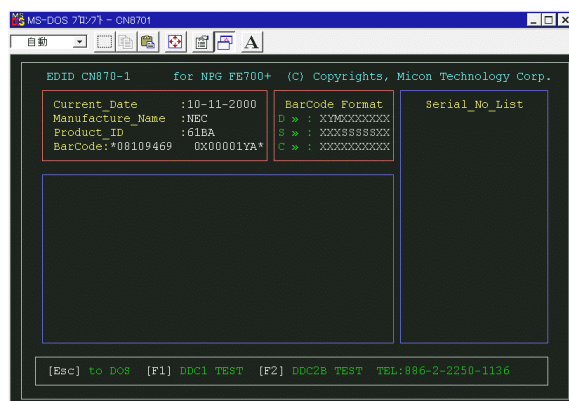
1-4. Inspection procedures

- Copy the above-mentioned programs in an adequate directory.
- Set up the MO-DOS mode. (DOS Prompt of Windows95/98 is also acceptable.)
- Execute the FE700VE.BAT from the command line.
- Check the serial number of the set and enter an input of the following code from the keyboard.

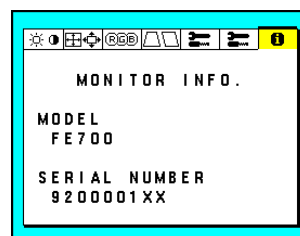
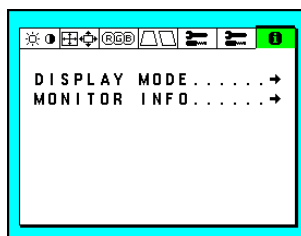
08109420 Serial Number (*+Model Code + 3 Spaces + Serial No. +*)

Example: *08109420...0X12345QA*

- Press the Enter key. Then, the EDID data, OSM model name, and the serial number begin to be written in.

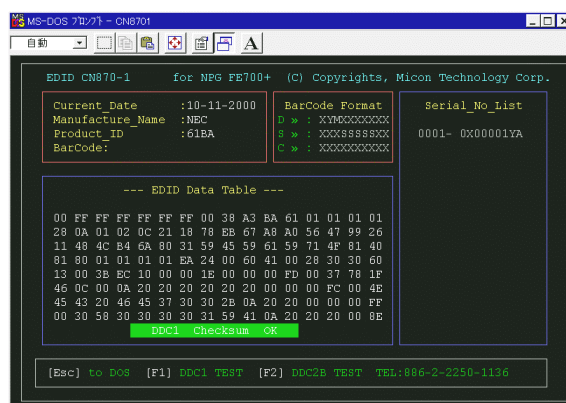


f. Display “MONITOR INFORMATION” of the OSM, and confirm that the model name and serial number have been correctly written.



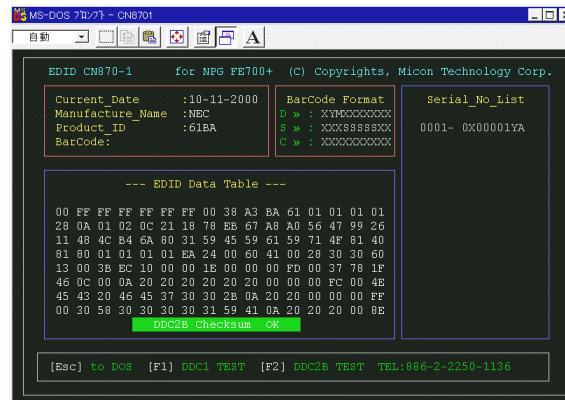
g. Press the F1 key to start the inspection of DDC1.

After the completion of inspection, the contents of EDID are displayed. If an error should occur, the related error message will be displayed in the bottom area of the screen. Refer to Paragraph 3.19.5 in regard to the meaning of this error message.



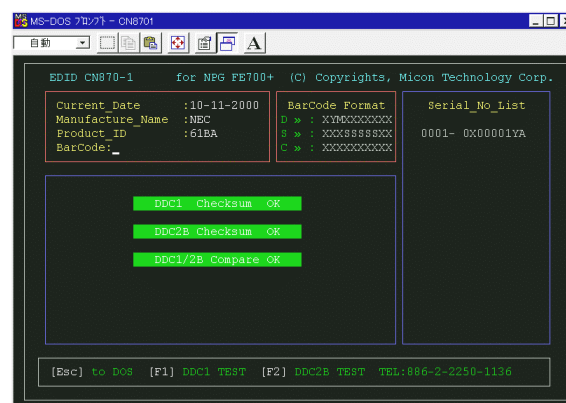
h. Press the F2 key to start the inspection of DDC2B.

After the completion of inspection, the contents of EDID are displayed. If an error should occur, the related error message will be displayed in the bottom area of the screen. Refer to Paragraph 3.19.5 in regard to the meaning of this error message.



- i. Press the F3 key to start the writing and inspection of DDC1 and DDC2B.

Even after the completion of inspection, the contents of EDID are not displayed. If an error should occur, the related error message will be displayed in the bottom area of the screen. Refer to Paragraph 3.19.5 in regard to the meaning of this error message.



1-5. Error messages

- IIC Communication Error
Communication disabled
- EDID Check Sum Error
Entry of false EDID
- DDC1 Does Not Find Head Data
DDC1 Communication disabled
- DDC2 Does Not Find Head Data
DDC2 Communication disabled

1-6. EDID data file

The EDID data file text is shown below. When you write or inspect EDID for this monitor, the following table can be used.

File name : FE700VE.TXT

| EDID-149 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|
| 00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 38 | A3 | 72 | 42 | 01 | 01 | 01 | 01 |
| 10 | *1) | *2) | 01 | 02 | 0C | 21 | 18 | 78 | EA | 20 | 78 | A0 | 56 | 48 | 9A | 26 |
| 20 | 12 | 48 | 4C | FF | FE | 80 | 31 | 59 | 45 | 59 | 61 | 59 | 71 | 4F | 81 | 40 |
| 30 | 81 | 80 | 01 | 01 | 01 | 01 | EA | 24 | 00 | 60 | 41 | 00 | 28 | 30 | 30 | 60 |
| 40 | 13 | 00 | 3B | EC | 10 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 37 | 78 | 1F |
| 50 | 46 | 0C | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 00 | 00 | FC | 00 | 4E |
| 60 | 45 | 43 | 20 | 46 | 45 | 37 | 30 | 30 | 0A | 20 | 20 | 20 | 00 | 00 | 00 | FF |
| 70 | 00 | *3) | *3) | *3) | *3) | *3) | *3) | *3) | *3) | *3) | *3) | *3) | *3) | *3) | 00 | *4) |

Table 1-6. Data list

- *1 : address 10h
 *2 : address 11h
 *3 : address 71h ~ 7Dh
 *4 : address 7Fh
- Manufactured month x 4
 Manufactured year - 1990
 Input serial number (ASCII code)
 Add 0Ah after serial number.
 Add 20th remaining address.
 Checksum. The sum of entire 128byte shall be equal to 00h.

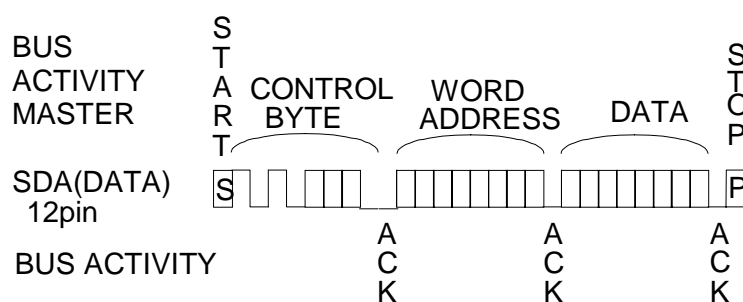


Diagram 1-6 Timing chart of DDC2B

2. CRT

2.1 CRT Face plate defect

2.1.1 Inspection condition

- (1) In the operating condition, observe the defect on the screen under following condition : 9,300K ($x=0.283$, $y=0.297$) white raster or the element monochrome raster which its brightness is 34cd/m^2 (10ft-L) on the screen center surrounding light is about 10 Lux
- (2) In the non-operating condition, observe the defect of the screen under light of about 200 Lux, measured at the faceplate.
- (3) Inspection shall be made more than 45 cm away from the screen.
- (4) Observe the screen on white raster and each monochrome color of red, green and blue.

2.1.2 Division of zone

A screen is divided into following 2 zones.

zone A : Area inside the rectangle that its size measures H : 300 mm, V : 225 mm in the center of screen.

zone B : Area outside the above rectangle

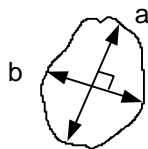
2.1.3 Limits

(1) CRT face defect

(a) Distance (minimum distance)



(b) Average diameter



Turn of $\frac{a+b}{2}$ (a: length, b: width)

(c) Limit

- Dark spot, Blocked aperture

| Average diameter(mm) | A | B | A + B | minimum distance |
|----------------------|------------|------------|-------------|------------------|
| 0.51 ~ | 0 | 0 | 0 | - |
| 0.31 ~ 0.50 | 0 | 0 | 0 | - |
| 0.15 ~ 0.30 | 6 (note 1) | 6 (note 1) | 10 (note 1) | 10 mm |

- Discoloration, stain, Missing phosphor, etc.

| Average diameter(mm) | A | B | A + B | minimum distance |
|----------------------|---|---|-------|------------------|
| 0.51 ~ 0.75 | 0 | 1 | - | 20 mm |
| 0.15 ~ 0.50 | 2 | 3 | - | 20 mm |

Note 1 : No missing spot larger than specified are allowed in Zone A.

Note 2 : The spec applies to each color.

(2) Face plate defect

(a) Blisters, opaque spots and elongated closed blisters

| Average diameter (mm) #1 | Allowable number(pcs) | | | Minimum Separation (mm) |
|-----------------------------|-----------------------|--------|-------|----------------------------|
| | Zone A | Zone B | Total | |
| 0.76 ~ | 0 | 0 | 0 | 30 |
| 0.51 ~ 0.75 | 0 | 1 | 1 | |
| 0.26 ~ 0.50 | 2 | 3 | 5 | |
| 0.11 ~ 0.25 | - | - | - | #2 |

#1: Mean diameter shall be either one of the following values, which is smaller.

$(a+b)/2$ or $a/20+2b$ (a: length , b: width)

#2:Maximum 5 pcs. In area of $\Phi 10\text{mm}$.

(b) Scratch

| Width(mm) | Allowable Length(mm) |
|-------------|----------------------|
| 0.16 ~ | rejected |
| 0.11 ~ 0.15 | 3 |
| 0.06 ~ 0.10 | 26 |
| ~ 0.05 | unlimited |

(c) Other glass defects

Flaw, crack and lack cannot be distinguish easily by naked eye.

Iron rust conforms to limited sample.

2.2 AR-film's surface defect

2.2.1 Inspection condition

- (1) Put a valve on an inspective stand and illuminate it from the top with white fluorescent light.
- (2) Valve surface illuminance is less than 1500Lux and more than 1000Lux.
- (3) Observe from distance of 40cm from surface, disregard flaws which can not be distinguished from this distance.

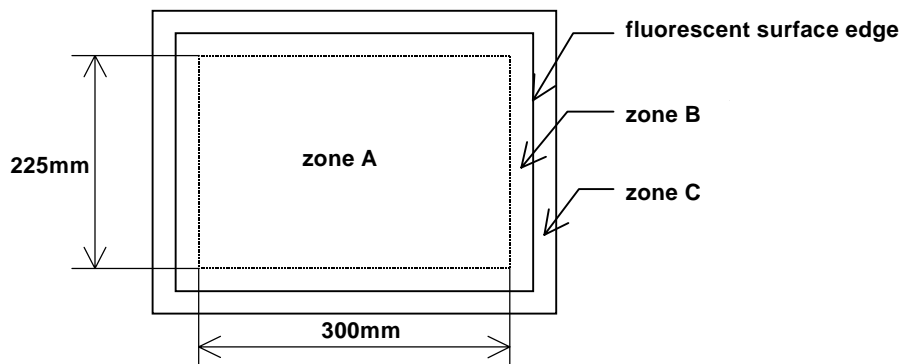
2.2.2 Division of zone

A screen is divided into following 3 zones.

zone A : Area inside the rectangle that measures H : 300 mm, V : 225 mm at the center of screen.

zone B : Area outside zone A and inside the fluorescent surface edge.

zone C : Area outside the fluorescent surface edge.



2.2.3 Limits

(1) Scratch

| Width(mm) | Allowable Length(mm)(Zone A + Zone B) |
|-------------|---------------------------------------|
| 0.16 ~ | reject |
| 0.11 ~ 0.15 | 13 |
| 0.06 ~ 0.10 | 26 |
| ~ 0.05 | unlimited |

NOTE 1 : Even though width of scratch is more than 0.16mm, regard scratch whose contrast is weak extremely as stain and apply standard of 3.2.

NOTE 2 : Do not recognize flaws which injures goods prices though it is not especially stipulated as for zone C.

(2) Opaque flaws (ex. Stain) and coating peeling

Do not apply the following standard to zone C.

Classify flaws by contrast and judge it by size every the contrast.

Definition of a contrast

High contrast : The foreign substance which shuts off light from fluorescence surface

Middle contrast : A semitransparent foreign substance and stain
(ex. coating material which has been changed)

Low contrast : stain and dust which do not reflect light from fluorescence surface and can be distinguished by its appearance

Note : Ignore the light spot with no interference color.

(However, Non of them with its size in excess of 3.75 mm is acceptable, that damages the product quality.)

Standard

| Average diameter classified by a contrast (Note 1) (mm) | | | Allowable number | | Allowable Length (mm) |
|--|-----------------|--------------|------------------|--------|--------------------------|
| High contrast | Middle contrast | Low contrast | zone A | zone B | |
| ~ 0.10 | ~ 0.20 | ~ 0.50 | Ignore | Ignore | - |
| 0.11 ~ 0.25 | 0.21 ~ 0.50 | 0.51 ~ 1.25 | 2[4] | 4[5] | 20 |
| 0.26 ~ 0.50 | 0.51 ~ 1.00 | 1.26 ~ 2.50 | 1[4] | 2[4] | 40 |
| 0.51 ~ 0.75 | 1.01 ~ 1.50 | 2.51 ~ 3.75 | 0[4] | 1[4] | 80 |

Values inside [] represent acceptable number in low contrast.

See the table in the next page for total defect number, which is acceptable in low contrast.

NOTE 1 : Convert $(a+b)/2$ or $a/20 + 2b$ small value into average diameter.

(a: length, b: width)

| total number of a low contrast flaws | zone A | zone B |
|--------------------------------------|--------|--------|
| Standard classified by zones | 6 | 8 |
| Total (zone A + zone B) | 10 | |

NOTE 1 : Acceptable interval shall be larger one in the case that defects have different interval.

NOTE 2 : There is no standard regarding zone C. Therefore, no defect is accepted that may deteriorate the value of products. Defect level by consultation. Discuss is necessary.

NOTE 3 Tolerance of defect size is approx. 10%.

(3) Reflectance

Less than 0.7% (at the screen center)

(4) Reflected color unevenness

The reflected color unevenness which can be confirmed easily in visual check must not exist.

(5) Strength

Wear and abrasion resistance : Coating should withstand 30 minute scrubbing with a #50 eraser. (load; 500g)

Pencil resistance : Coating should withstand 3H pencil. (according to conformed item of Coating Strength JIS - 5400)

[Supplementary explanation]

Definition of striped coating (tear) and flaw (rubbed coating). (according to JIS)

Striped coating (tear) : Tear that reaches to the glass surface.

Flaw (rubbed coating) : Scratches that slightly dig into the surface of the coating

(6) Dirt, cloudiness, color irregularity, streaks and other defects

No defects should not be detected when white or green raster are on the screen.

Set the new boundary sample if necessary.

2.2.4 Notice for cleaning up the surface of faceplate filmed over by the AR - film.

- (1) Do not rub CRT surface with hard objects or hit CRT surface.
- (2) Wipe off the dust softly with a dry soft cloth.

Do not use acid cleaner, alkaline cleaner, solution such as detergent or thinner, etc.

If dust can not be wiped off with a dry soft cloth, use the water, ethyl alcohol neutral glass cleaner or detergent.

- (3) If and when necessary to touch CRT surface with a tool, perform it with care.
- (4) Be careful not to damage or scratch CRT surface with a hard foreign object, etc. while cleaning.

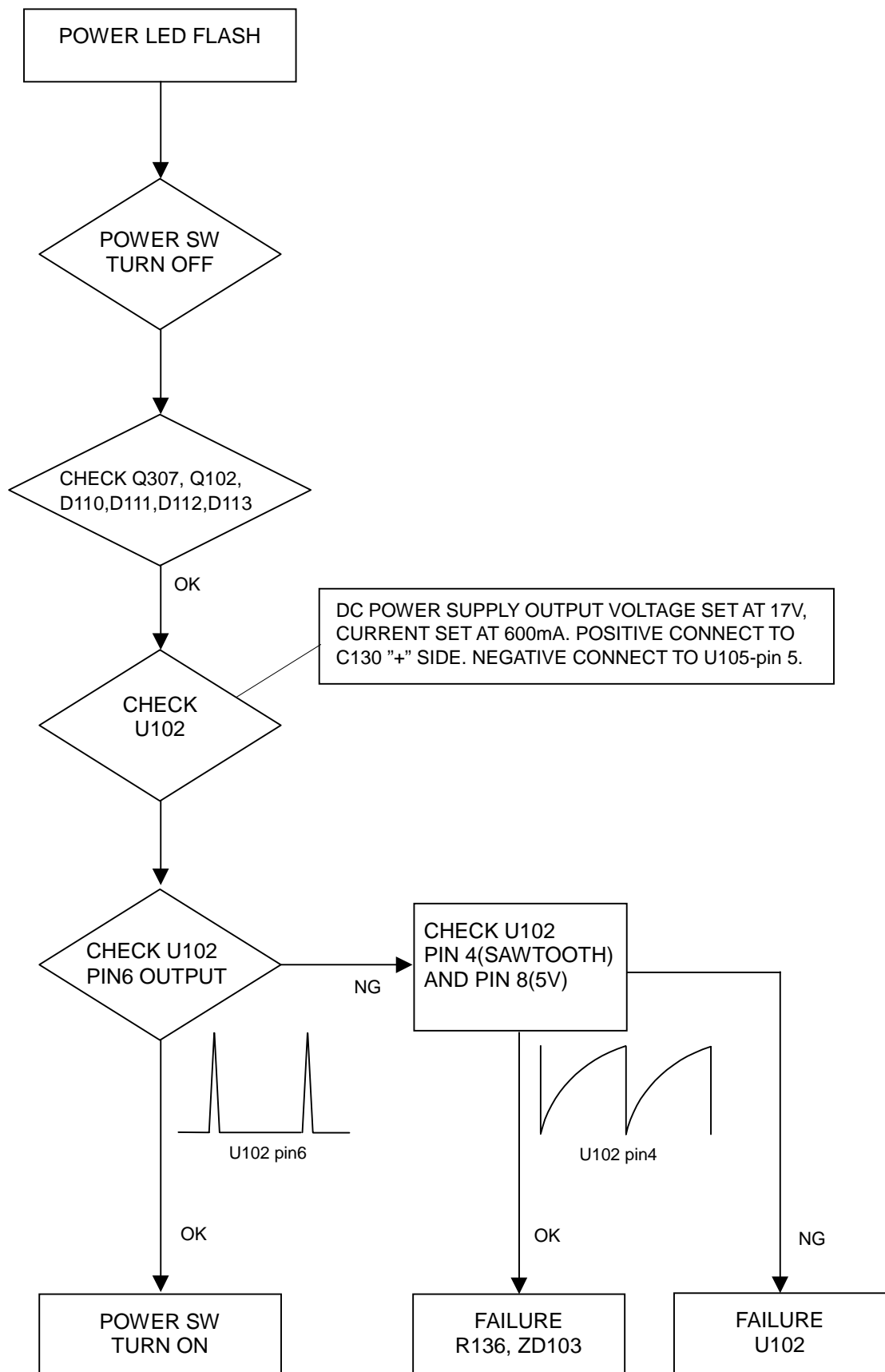
TROUBLE SHOOTING

Refer to User's Manual trouble shooting section before using this chart.

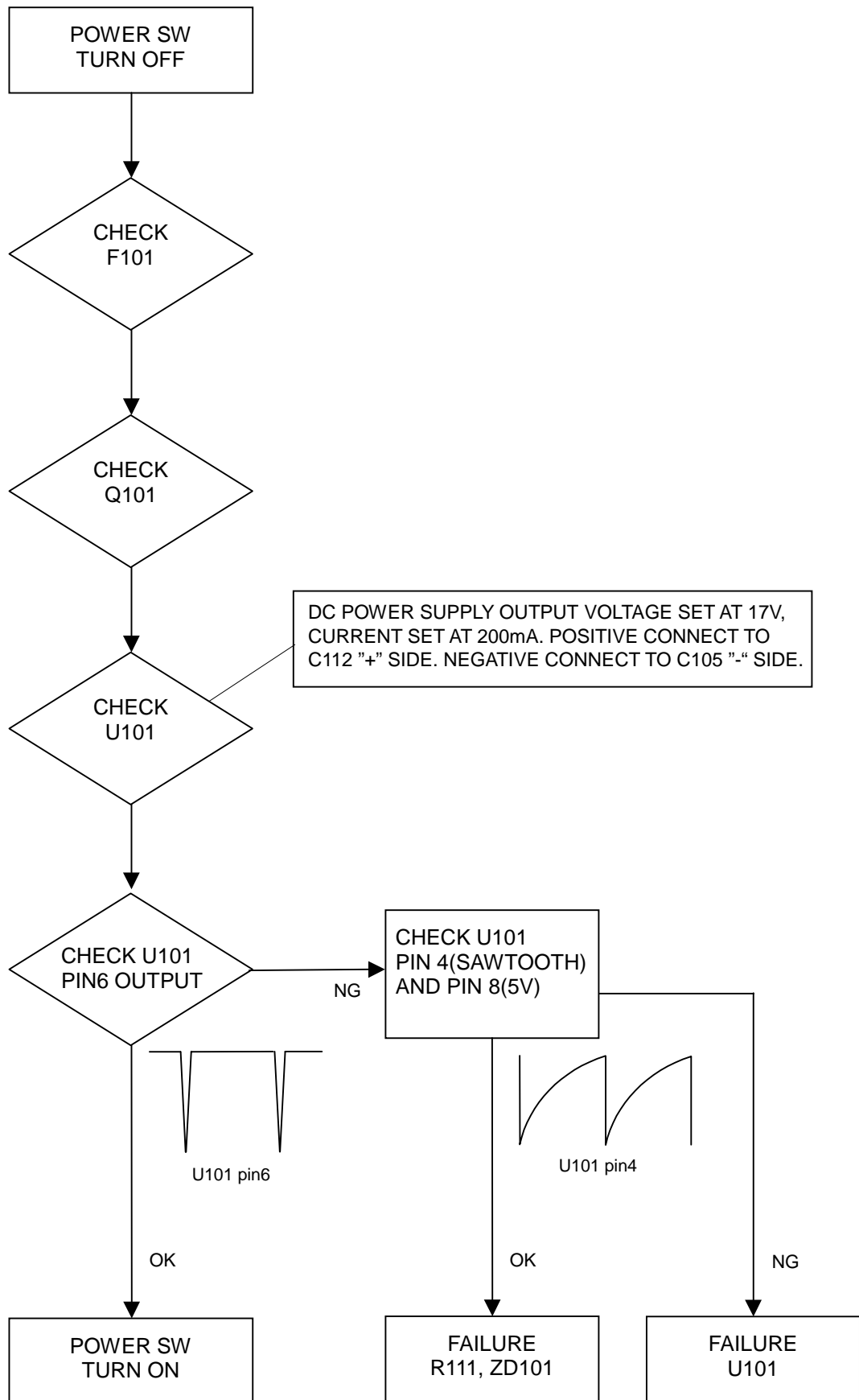
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| 7. POOR PINCUSHION CORRECTION | 7-8 |

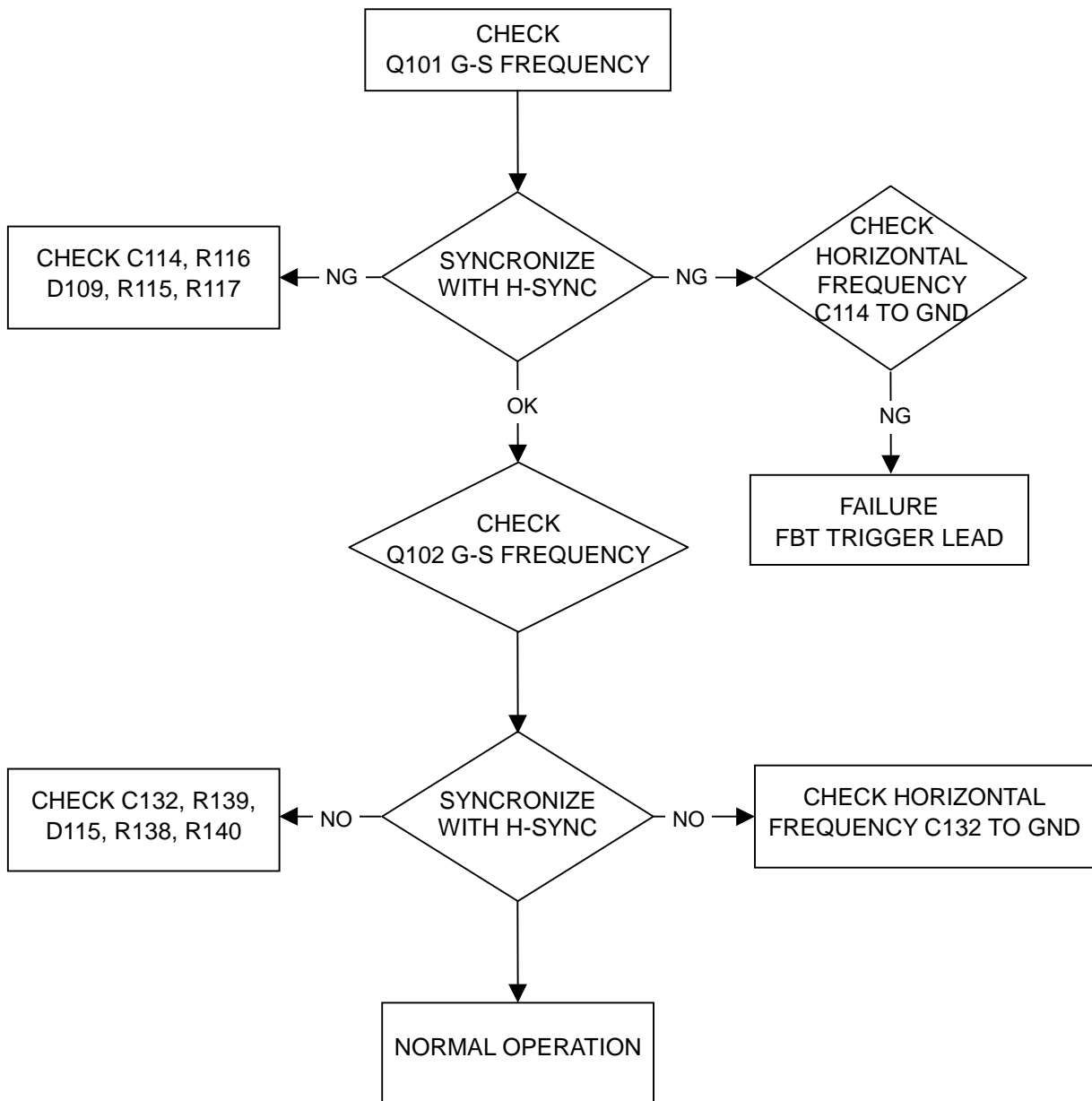
1. NO OPERATION, POWER LED FLASH



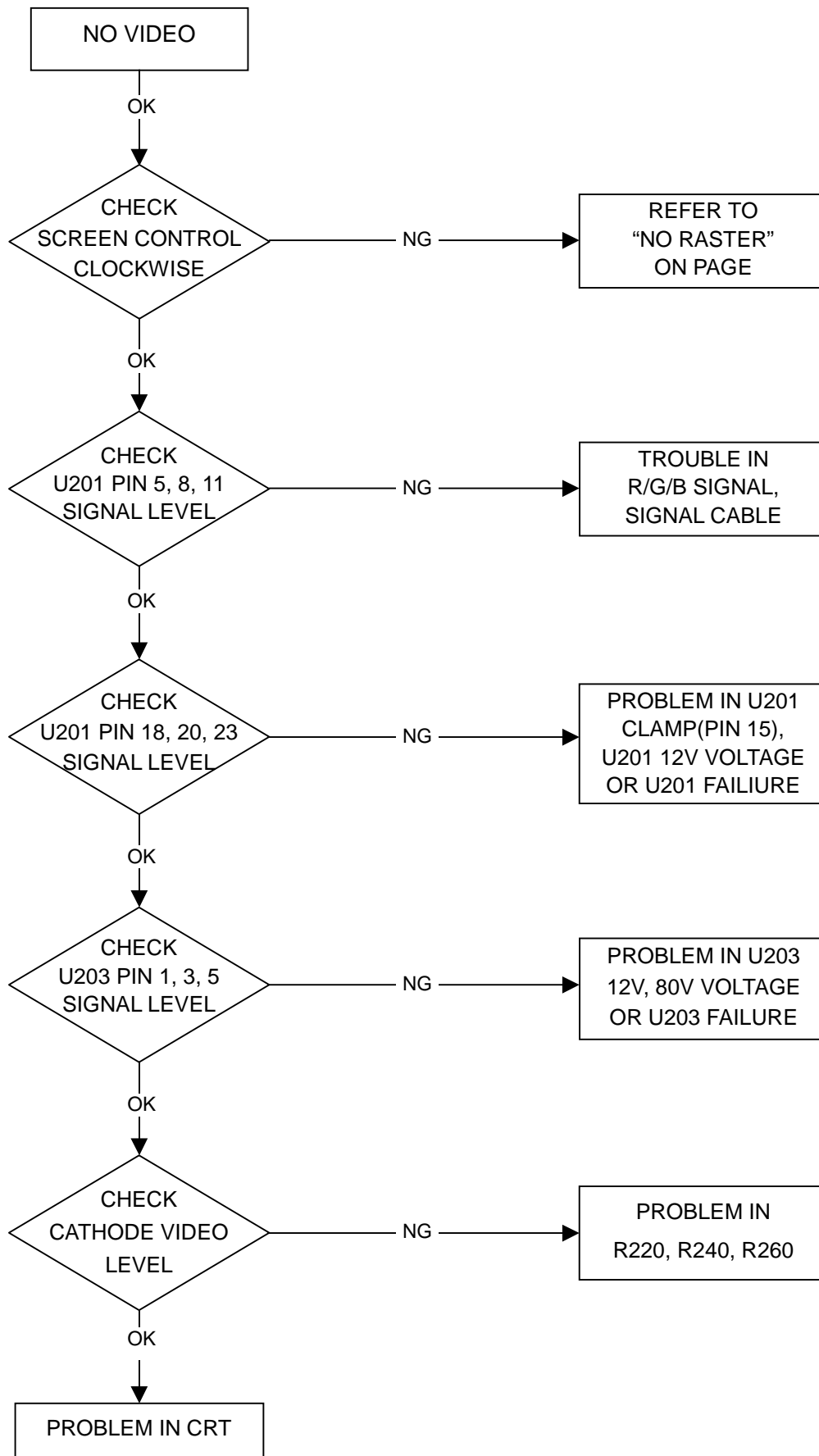
2. NO OPERATION, POWER LED OFF



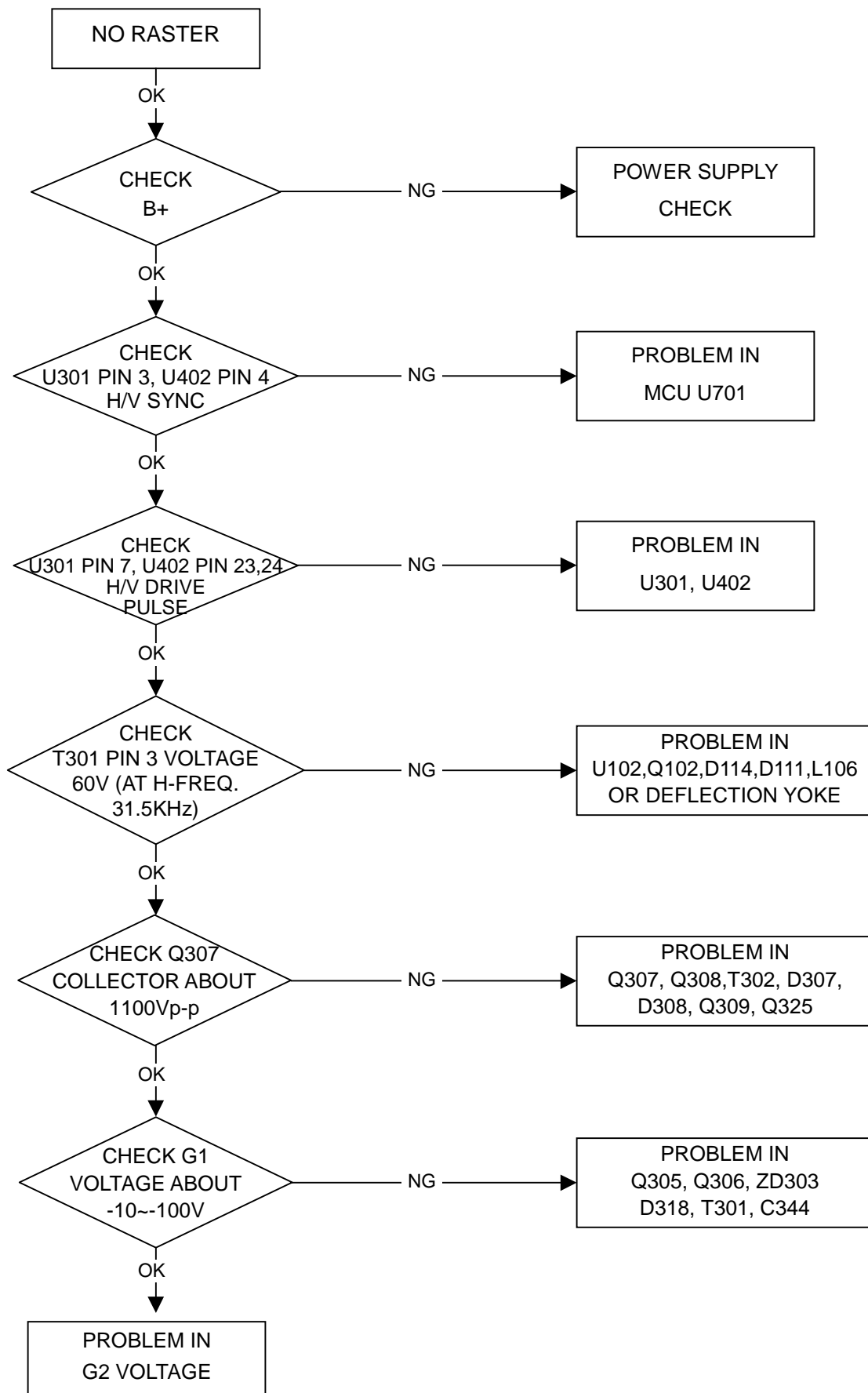
3. VIDEO NOISE, UNSYNCHRONOUS



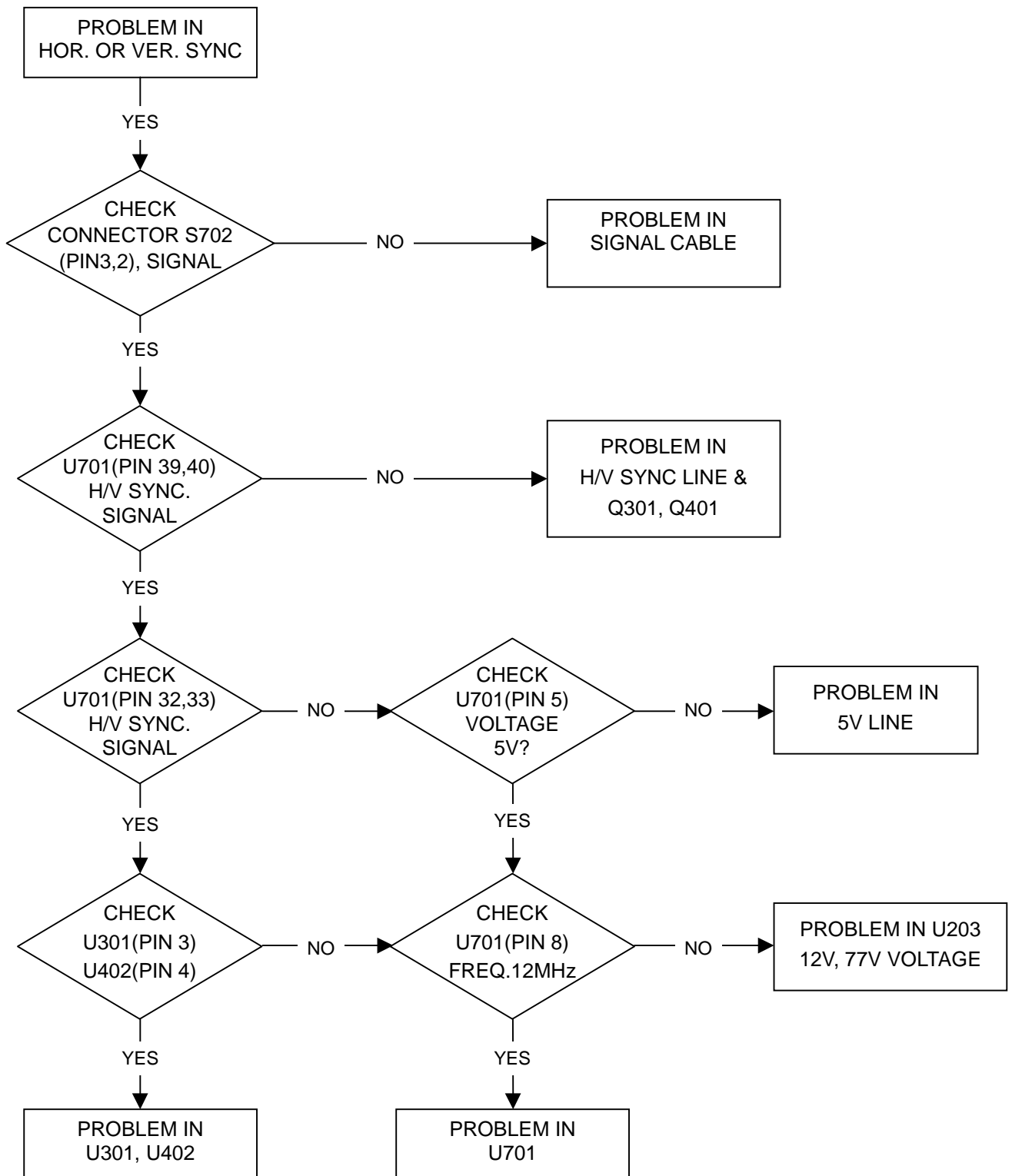
4. NO VIDEO



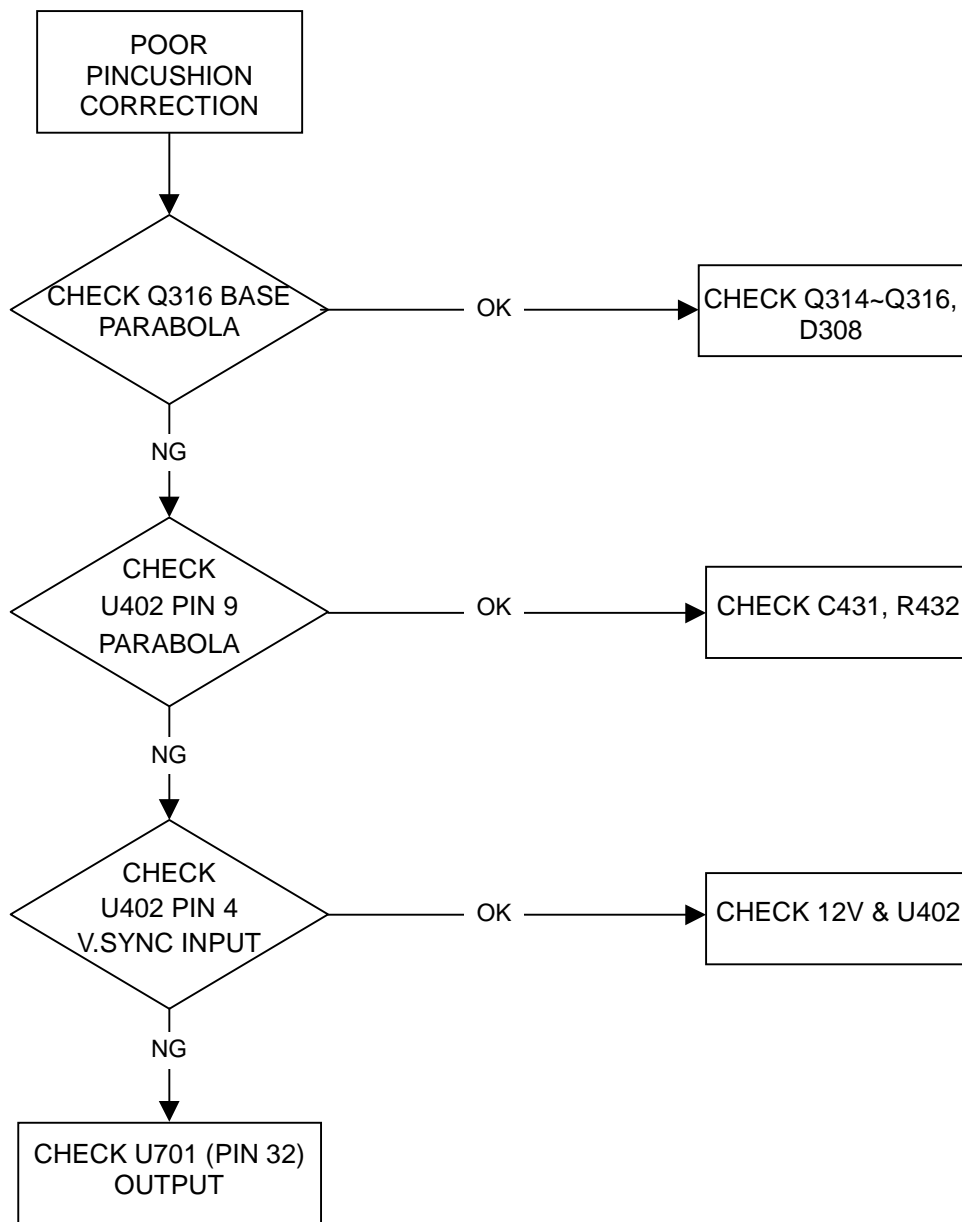
5. NO RASTER



6. TROUBLE IN H. V SYNC



7. POOR PINCUSHION CORRECTION



CIRCUIT DESCRIPTION

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1. Power supply circuit

① Outline

This power supply unit adopts the switching mode technology, and is an off-line mode type unit that provided several different DC outputs. The scanning frequency is available in different values ranging from 31 kHz to 70 kHz. Moreover, it is capable to operate at an AC input voltage of 100V ~ 240V and an AC frequency of 50/60 Hz \pm 3Hz.

The block diagram is the functional construction schematics, that shows the major functions of this power supply unit.

② EMI

The EMI circuit has a 2-stage construction, with the first stage consisting of the common mode choke unit and one X-capacitor, and the second stage consisting of the common mode choke unit and four Y-capacitors.

R101 is the bleed resistor of the X-capacitor. When the power supply switch is turned OFF, this resistor carries out the emergency charging of the capacitor C101.

The EMI is the circuit that prevents the monitor switching noise from being generated, there by minimizing the negative influence on the other electronic equipment.

③ AC rectifier and smoothing capacitor

The AC input is rectified by means of the full-bridge rectifier, that consists of the diodes D101 to D104. The AC voltage is converted into the DC voltage by passing through the next stage, that consists of the smoothing capacitor C105.

TH101 is a NTC thermistor for the power supply at the in-rush current limit.

④ Degaussing circuit

The degaussing circuit consists of the PTC thermistor TH102, the degaussing coil and the relay RL101. The relay is controlled by means of the +12V control signal coming from the CPU.

⑤ Transformer and energy induction

1) When the PWM controls IC KA3842A chip, a driving pulse is generated at the gate of the transistor Q101, and Q101 turns ON. The current returns from the "plus" (+) side of the energy-supplying capacitor C105 to the "minus" (-) side of the same capacitor C105, passing through the transformer Q101 D-S. During the ON cycle, the energy is stored in the transformer T101. The transistor Q101 turns OFF when the driving pulse disappears from Q101. As a result, all voltages of the dot ends of the winding flow to the positive direction and reach the fly-back rectifier. At that point of time, the diodes of the rectifier of the secondary side turn ON, a temporary energy is induced at the secondary side, and the ON cycle of the driving pulse is repeated.

- 2) The power supply MOS FET Q101 carries out the ON/OFF operation of the control unit, by means of U101 KA3842A. KA3842A is a PWM (pulse width modulation) IC chip, with 16 V starting voltage and 10 V cut-off voltage.

The following list shows the pin layout of KA3842A pulse width modulation IC chip.

| | | | |
|--------|----------------|--------|--------------|
| Pin 1: | Feedback | Pin 2: | Compensation |
| Pin 3: | Current sensor | Pin 4: | Oscillator |
| Pin 5: | Ground (GND) | Pin 6: | Pulse output |
| Pin 7: | VCC | Pin 8: | VREF (5.1 V) |

3) Over current protection

R111 is a sensor resistor, and it has the function of increasing the current of this loop when the output of the secondary side is either in the overloaded state or is insufficient.

Since the current passing through the R111 sensor resistor has voltage dropping effect, the operation of the output pulse is stopped when a voltage lower than 1 Volt is detected at the pin number 3 of the KA3842A 3chip, and the switch of the power supply MOS FET is kept in the “break” state until the VCC voltage is charged up to 16 Volts, and the operation of U101 KA3842A is resumed. When it is not clearly known whether there is secondary voltage's shortage or not, this circuit repeats the ON/OFF switching, and the power supply LED lights up.

4) Starting circuit

The resistor R123 and R148 and the transistor Q112 and diode D119 and resistor R131, R149 and zener diode ZD105 are for the starting operation. When the circuit starts its operation, the power supply transformer T101 supplies the auxiliary 12 Volt power to the control IC chip U101 via pins 6 and 7 of the winding transformer T101.

5) Synchronization circuit

The synchronization signal is induced from the fly-back transformer (FBT), and carries out the synchronization with the power supply frequency. The frequency range is from 31 kHz to 70 kHz, and the component elements of the synchronization circuit are C114, R116, D109, R115 and R117.

6) Feedback circuit

The feedback circuit loop induces the 12 V voltage through the pin 6 and the pin 7 of the power supply transformer. That voltage is connected with the pin 3 of the IC chip U101 by passing through D108, C113 and passing next through R122, VR101 and R120. This is a regular loop.

7) Snubber circuit

The snubber circuit has the function of clamping the ON/OFF spikes of the power supply MOS-FET, and its component elements D105, C106, R106 make up a snubber that turns OFF the power supply MOS-FET.

8) Secondary rectifier and smoothing rectifier

The secondary rectifier is a harmonic rectifier consisting of D111, C124 and R128, and it works as a snubber circuit as well. The capacitors C120 and C138 are the smoothing rectifier working on the 45 Volt DC output. There are also other DC outputs, such as 80 Volt (D110), 13.6 Volt (D112) and 8.8 Volt (D113).

⑥ Power saving

Suspend mode : Every DC voltage operation of the CRT is turned OFF.

The color of the power LED101/102/103 switches from green to yellow.

OFF mode : This is the mode in which the CPU control unit turns OFF the power supply, but the power turns ON when the user touches the keyboard.

The power LED switches to orange color.

- 1) The turn on the monitor power switch when H-SYNC and V-SYNC from PC is nothing. At that time, if the video is shifted from the free-run mode to the suspend mode, the transistor Q107 turns OFF and the operation returns to the OFF mode within a few seconds.
- 2) As for the sequence of steps that turn the operation to the OFF mode, if the keyboard is not touched for a given period of time that a preset in advance, the CPU outputs the LOW level signal to the transistor Q107, then Q105 turns OFF, the transistor Q108 and Q104 turns OFF. As a result the power is shut out at that state.
- 3) When the user touches the keyboard in the OFF mode, the operation is resumed, the video signals V-SYNC and H-SYNC turn ON the CPU via resistor R129 and R159, then the transistor Q105 and Q107 turn ON, the transistors Q104 and Q108 turn ON. As a result the operation returns to the ON state.

⑦ DC/DC

The DC/DC voltage is DC 45 volts, and since the set-up voltage is variable from 62 volts to 160 volts, it is variable depending on the horizontal synchronism. The frequency band is variable from 31 kHz to 70 kHz. The voltage is fed back from the fly-back transformer (FBT). The DC/DC output voltage is used as high-voltage input of FBT T301.

- 1) DC/DC is a step-up circuit, and consists mainly of the choke L106, the transistor Q102, the diode D114 and U102.
- 2) When the PWM controls U102 IC KA3843, a driving pulse is generated at the gate of the transistor Q102, and the transistor Q102 turns ON. During the ON cycle, the energy is stored in the choke L106. The transistor Q102 turns OFF when the driving pulse disappears from the gate of the transistor Q102. As a result, the voltage at the dot terminal of the winding flows in the positive direction and goes to the fly-back rectifier. The energy stored in the choke L106 is entered in the FBT, passing through the choke L106, the diode D114 and the capacitor C129.
- 3) The feedback is detected by the FBT via diode D130, the capacitor C145, the resistor R145 the variable resistor VR102 and the fixed resistor R146, and is connected to the U102-2 pin.
This loop is the regular type one .
- 4) The frequency of the synchronization signal coming from video H-SYNC is variable from 31 kHz to 70 kHz. The circuit consists of the capacitor C132, the resistor R139, the diode D115, the resistor R138 and the resistor R140.
- 5) The soft start circuit consists of the resistor R178, the capacitor C164, the diode D133 and the diode D117.

2. MCU

Monitor MCU Specification for Model FE700 (N9705)

Frequency Specification

H-freq. : 29.5K – 71KHz

V-freq. : 43 – 160Hz

Judge polarity only when frequency is 31.5 KHz and 37.8 KHz

Support composite sync detection

System Architecture

1. MCU – Weltrend WT6132, 32K bytes ROM size
2. EEPROM – 24C04 series, 4K bit, with ID code for identify initialization.
3. OSD – Myson MTV021N20

Input

1. Sync input – 2 pins for H-sync & V-sync frequency inverted input.
2. Key input – 2 pins for A/D key input (EXIT, -, +, DOWN, UP, PROCEED and RESET).
3. Reset input – low pulse for reset MCU
4. Crystal input – 2 pins using 12MHz crystal.

Output – MCU digital pin

1. Degauss – Active high pulse for 5 sec when in degauss. MCU will activate degauss while power on.
2. CS output – 3 pins (CS2, CS1, CS0) for CS control

| H-sync | CS2 | CS1 | CS0 |
|-----------------------|-----|-----|-----|
| fH =< 33.8KHz | 0 | 0 | 0 |
| 33.8KHz< fH =<36.5KHz | 0 | 0 | 1 |
| 36.5KHz< fH =<42.6KHz | 0 | 1 | 1 |
| 42.6KHz< fH =<44.3KHz | 1 | 0 | 0 |
| 44.3KHz< fH =<51.2KHz | 1 | 0 | 1 |
| 51.2KHz< fH =<62.0KHz | 1 | 1 | 0 |
| 62.0KHz< fH =<71.0KHz | 1 | 1 | 1 |
| 71.0KHz< fH | 0 | 0 | 0 |
| Mode change | 0 | 0 | 0 |

3. Power saving – 2 pins (#SUSPEND, #P-OFF) for power saving control

- if fH > 71KHz or fH < 30KHz, enter power saving mode (Stand By).
- enter power saving mode after 3 sec when condition met.
- enter suspend mode first for 3 sec before enter off mode if off mode condition met.

| Mode | H-sync freq. | V-sync freq. | #SUSPEND | #P-OFF |
|----------|--------------|--------------|----------|--------|
| ON | Yes | Yes | 1 | 1 |
| Stand By | No | Yes | 1 | 1 |
| Suspend | Yes | No | 0 | 1 |
| Off | No | No | 0 | 0 |

4. Mute – 2 pins for screen mute

Mute1 – active low pulse for about 0.6 sec when mode change.

Mute2 – active low pulse for about 1.0 sec when mode change, active with mute 1 simultaneously.

5. D/A

- MCU has 14 pins PWM output which are Brightness, Contrast, H-phase, H-size, V-center, V-size, Pincushion, Trapezoid, Rotation, Parallel, Pin-balance, R-gain, G-gain and MOIRE CANCELER.
- OSD IC has 4 pins PWM output which are B-gain, R-bias, G-bias and B-bias.

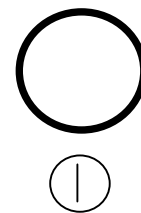
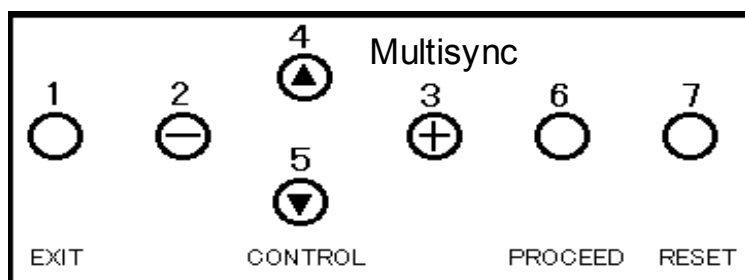
6. Sync output – 2 pins for H-sync and V-sync negative output, normal high.

7. DDC – 2 pins (DDC SDA/DDC SCL) for DDC1/DDC2B or auto alignment control.

- In auto alignment mode, all keys and OSD are disabled.

8. SDA/SCL – 2 pins for EEPROM and OSD control.

Control Panel Operation



1. Key arrangement – 7 keys for OSD control.

2. Hot key operation

RESET key – Enter selftest mode if pressed when power on In User Mode.

I²C interface

1. DDC1/DDC2B – VESA DDC1/DDC2B is supported.
2. Auto alignment – I²C auto alignment protocol is supported.

Timing Table

Total 20 preset modes.

| Mode | Resolution | H-sync. | V-sync. | H polarity | V polarity |
|------|-------------------|---------|---------|------------|------------|
| 1 | VGA350 | 31.5KHz | 70Hz | + | - |
| 2 | VGA400 | 31.5KHz | 70Hz | - | + |
| 3 | VGA480 | 31.5KHz | 60Hz | - | - |
| 4 | 640*400(70)(P/P) | 31.5KHz | 70Hz | + | + |
| 5 | VESA800*600(60) | 37.9KHz | 60Hz | + | + |
| 6 | MAC640*480 | 35.0KHz | 67Hz | - | - |
| 7 | VESA640*350(85) | 37.9KHz | 85Hz | + | - |
| 8 | VESA640*400(85) | 37.9KHz | 85Hz | - | + |
| 9 | VESA640*480(75) | 37.5KHz | 75Hz | - | - |
| 10 | 640*480(75)(P/P) | 37.5KHz | 75Hz | + | + |
| 11 | XGA | 35.5KHz | 87Hz | + | + |
| 12 | VESA800*600(75) | 46.9KHz | 75Hz | + | + |
| 13 | VESA640*480(85) | 43.3KHz | 85Hz | - | - |
| 14 | MAC832*624 | 49.7KHz | 75Hz | - | - |
| 15 | VESA800*600(85) | 53.7KHz | 85Hz | + | + |
| 16 | VESA1024*768(70) | 56.5KHz | 70Hz | - | - |
| 17 | VESA1024*768(75) | 60.0KHz | 75Hz | + | + |
| 18 | VESA1280*1024(60) | 64.0KHz | 60Hz | + | + |
| 19 | VESA1024*768(85) | 68.7KHz | 85Hz | + | + |
| 20 | VESA1024*768(60) | 48.4KHz | 60Hz | - | - |

Signal Flow Chart

| Input Signal | | | (a) | (b) | (c) |
|-----------------------------|---------------|----------------|-----------------|-----|-----|
| 30.0kHz=<fH<33.8kHz | Sync.Pol. *2 | | | | |
| | Hori. | Ver. | | | 1 |
| | Posi. | Nega. | VGA350 | | 2 |
| | Nega. | Posi. | VGA400 | | 3 |
| | Nega. | Nega. | VGA480 | | 4 |
| 33.8kHz=<fH<42.6kHz fV<63Hz | 63Hz=<fV<72Hz | Sync.Pol. *2 | 640x400@70(P/P) | | 5 |
| | | | | | 6 |
| | | | | | 7 |
| | | | | | 8 |
| | | | | | 9 |
| | 72Hz=<fV<86Hz | | 640x400@70(P/P) | | 10 |
| | | | | | 11 |
| | | | | | 12 |
| | | | | | 13 |
| | 86Hz=<fV | | | | 14 |
| | | | | | 15 |
| 42.6kHz=<fH<48.9kHz fV<**Hz | | VESA800x600@60 | VESA800x600@56 | 16 | |
| | | MAC 640x480 | | 17 | |
| | | | | 18 | |
| 48.9kHz=<fH<51.3kHz | | | | 19 | |
| | | | | 20 | |
| | | | | 21 | |
| 51.3kHz=<fH<55.0kHz | | | | 22 | |
| | | | | 23 | |
| 55.0kHz=<fH<57.3kHz | | | | 24 | |
| | | | | 25 | |
| 57.3kHz=<fH<62.0kHz | | | | 26 | |
| | | | | 27 | |
| 62.0kHz=<fH<66.0kHz | | | | 28 | |
| | | | | 29 | |
| 66.0kHz=<fH<71.0kHz | | | | 30 | |
| | | | | 31 | |

Note: 1 (a)SIGNALS ARE ADJUSTMENT SIGNALS
 (b)SIGNALS DO NOT HAVE BACK-UP MEMORIES
 (c)NUMBER(OSM)
 2 These Sync Polarity are signal cable input.
 MCU input are reversed.

Pin Definition

1.MCU

| Pin No. | Pin name | I/O | Signal name | Function | |
|---------|-----------|-----|-------------|-------------------------|-----|
| 1 | PWM2 | O | HP | H-position | D/A |
| 2 | PWM1 | O | BOW | Pin-balance | D/A |
| 3 | PWM0 | O | HS | H-size | D/A |
| 4 | /RESET | I | RESET | Low reset | |
| 5 | VDD | | VCC | +5V | |
| 6 | GND | | GND | Ground | |
| 7 | OSC0 | I/O | XTAL2 | 12MHz oscillator output | |
| 8 | OSC1 | I | XTAL1 | 12MHz oscillator input | |
| 9 | PB5/SDA2 | I/O | MSDA | EEPROM/OSD SDA | |
| 10 | PB4/SCL2 | I/O | MSCL | EEPROM/OSD SCL | |
| 11 | PB3/PAT | I/O | SELFTEST | Test Pattern | |
| 12 | PB2 | I/O | CS1 | CS1 | |
| 13 | PB1 | I/O | CS0 | CS0 | |
| 14 | PB0 | I/O | #P-OFF | PMS Off | |
| 15 | /IRQ/VPP | I/O | WP | N/C | |
| 16 | PC7 | I/O | #MUTE2 | Mute2 | |
| 17 | PC6 | I/O | DEG | Degauss out | |
| 18 | PC5 | I/O | #MUTE1 | Mute1 | |
| 19 | PC4 | I/O | #SUSPEND | PMS Suspend | |
| 20 | PC3/AD3 | I/O | P-ON | Detect power on | |
| 21 | PC2/AD2 | I/O | CS2 | CS2 | |
| 22 | PC1/AD1 | I/O | KS1 | EXIT/⊖/⊕/RESET key | |
| 23 | PC0/AD0 | I/O | KS2 | ⊕/⊙/PROCEED key | |
| 24 | SDA1/PA0 | I/O | SDA | DDC SDA | |
| 25 | SCL1/PA1 | I/O | SCL | DDC SCL | |
| 26 | PA2/PWM8 | I/O | ROT | Rotation | D/A |
| 27 | PA3/PWM9 | I/O | CONTRAST | CONTRAST | D/A |
| 28 | PA4/PWM10 | I/O | BRIGHT | BRIGHTNESS | D/A |
| 29 | PA5/PWM11 | I/O | R | R-gain | D/A |
| 30 | PA6/PWM12 | I/O | G | G-gain | D/A |
| 31 | PA7/PWM13 | I/O | MC | Moire Cancel | D/A |
| 32 | PDO/VOUT | I/O | V-OUT | V-sync out | |
| 33 | PD1/HOUT | I/O | H-OUT | H-sync out | |
| 34 | PD2/PWM7 | O | VC | V-center | D/A |
| 35 | PD3/PWM6 | O | PARA | Parallel | D/A |
| 36 | PD4/PWM5 | O | TRAP | Trapezoid | D/A |
| 37 | PD5/PWM4 | O | PIN | Pincushion | D/A |
| 38 | PWM3 | O | VS | V-size | D/A |
| 39 | HIN | I | H-SYNC | H-sync input | |
| 40 | VIN | I | V-SYNC | V-sync input | |

2.OSD IC

| Pin No. | Pin name | I/O | Signal name | Function | |
|---------|----------|-----|-------------|----------|-----|
| 9 | PWM0 | O | B | B-gain | D/A |
| 10 | PWM1 | O | G-bias | G-bias | D/A |
| 11 | PWM6 | O | B-bias | B-bias | D/A |
| 12 | PWM7 | O | R-bias | R-bias | D/A |

GENERAL DESCRIPTION

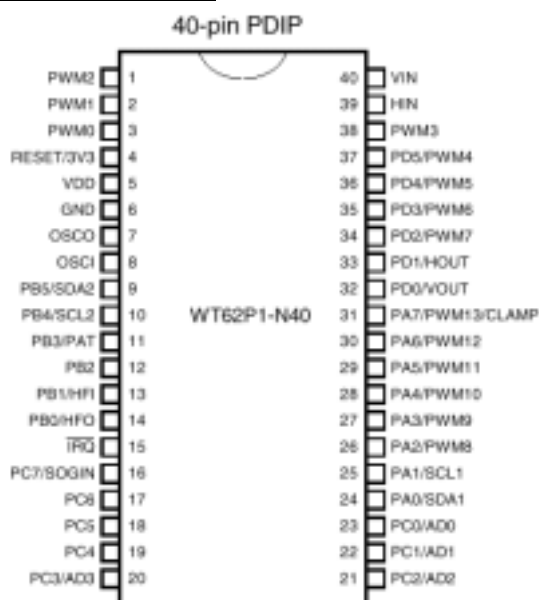
The WT6132/62P1 is a microcontroller for digital controlled monitor with Universal Serial Bus (USB) interface.

It contains an 8-bit CPU, 32K bytes flash memory, 512 bytes RAM, 14 PWMs, parallel I/Os, SYNC signal processor, timer, DDC1/2B interface, master/slave I²C interface, low speed USB device module, 6-bit A/D converter and watch-dog timer.

FEATURES

- 8-bit 6502 compatible CPU with 6MHz operating frequency
- 32768 bytes flash memory, 512 bytes SRAM
- 12MHz crystal oscillator
- 14 channels 8-bit PWM outputs
- Sync signal processor with H+V separation, H/V frequency counter, H/V polarity detection/control and clamp pulse output
- Six free-running sync signal outputs (Horizontal frequency up to 106KHz)
- Self-test pattern
- DDC1/2B supported
- Fast mode master/slave I²C interface (up to 400KHz)
- Embedded USB function with endpoint 0 and endpoint 1
- Built-in 3.3V regulator for USB transceiver
- Watch-dog timer
- Maximum 28 programmable I/O pins
- One 8-bit programmable timer
- 6-bit A/D converter with 4 selectable inputs
- One external interrupt request input
- Low VDD reset

PIN CONFIGURATION

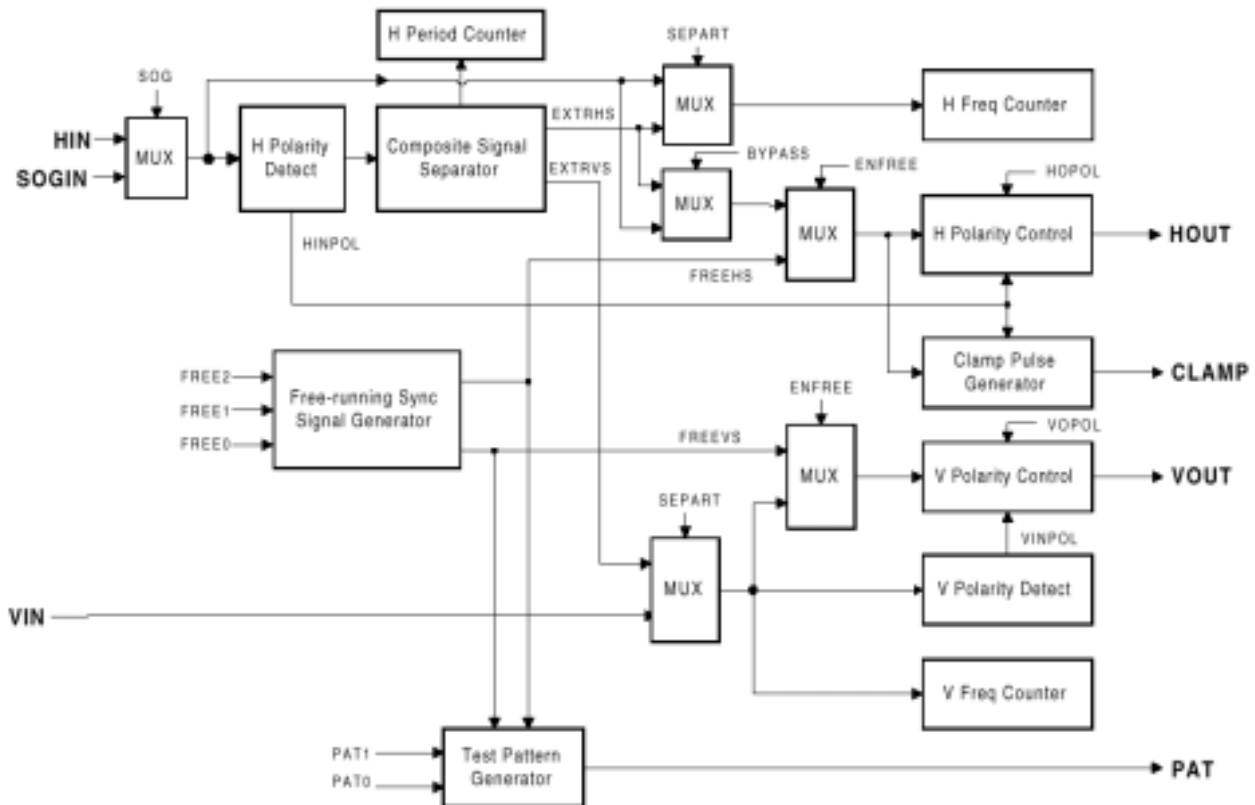


* I²C is a trademark of Philips Corporation.

* DDC is a trademark of video Electronics Standard Association (VESA).

SYNC Processor

The SYNC processor can : (1) separate the composite sync signal; (2) calculate HSYNC and VSYNC frequencies; (3) detect polarities of HSYNC and VSYNC input; (4) control the output polarities of HSO and VSO pin; (5) generate free-running horizontal and vertical sync signals for burn-in test; (6) generate self-test pattern signal.

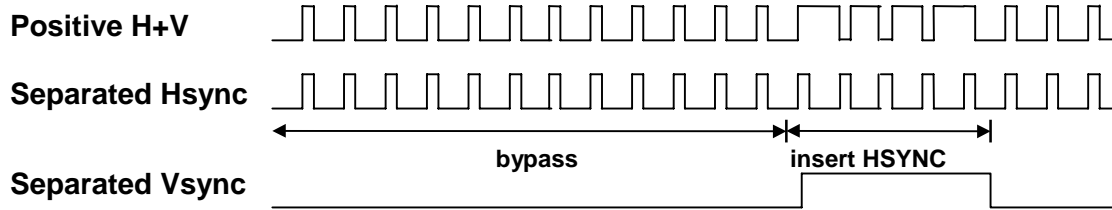


Composite Sync Signal Separation

The composite sync signal comes from HSYNC pin and is separated by the sync separator.

The operations of sync separator are:

- detect the polarity and convert composite sync signal to positive polarity.
- extract Vsync
 - Pulse width less than 6us will be filtered, the Vsync will be widened about 5.5~6.5us.
- count the pulses during the separated V sync is low, and save the counted value (N_H).
- bypass the composite sync pulses before the counter equals to N_H .
- start inserting Hsync pulses after the counter equals to N_H until the separated Vsync is low.
- the period of inserted Hsync is decided by the last two bypassed Hsync.
- the pulse width of the inserted Hsync is 2us.



To decide whether the HSYNC input is a composite sync signal or not, program should check the frequency of VSYNC first (reset H+V bit to "0"). If the VSYNC frequency is lower than 15.25Hz (OVF2=1), set H+V bit to "1" and check VSYNC frequency again. If VSYNC still has no frequency, that is power saving condition, program should reset H+V bit. If it has a valid frequency, the HSYNC input is composite signal.

Frequency Calculation

Horizontal frequency and vertical frequencies calculation are done by using one 10-bit up counter. After power is on, the SYNC processor calculates the vertical frequency first (H/V bit = "0"). A 31.25KHz clock counts the time interval between two VSYNC pulses, then sets the FRDY bit and generates an INT1 interrupt (if IEN_S bit is "1"). The software can either use interrupt or polling the FRDY bit to read the correct vertical frequency. After reading the REG#16H, the FRDY bit is cleared to "0", counter is reset and H/V bit is set. The SYNC processor starts to count horizontal frequency. The horizontal frequency calculation is done by counting the HSYNC pulses in 8.192 ms. Like the vertical frequency, the horizontal frequency can be read when the FRDY bit is set or INT1 occurs. After reading the REG#16H, the FRDY, INT_S and H/V bits are cleared. The SYNC processor starts to calculate the vertical frequency again, and so on.

The relationships between counter value and frequency are:

$$\text{Hfreq} = (\text{counter value} \times 122.07) \text{ Hz}$$

$$\text{Vfreq} = (31250 / \text{counter value}) \text{ Hz}$$

The frequency range:

Hfreq range: 122.07 Hz to 124.8 kHz; Resolution: 122.07Hz

Vfreq range: 30.5 Hz to 31.25 kHz

If counter overflowed, the OVF1 bit will be set to "1". The counter keeps on counting until it overflowed again. The OVF2 bit and FRDY bit will be set when counter overflowed twice.

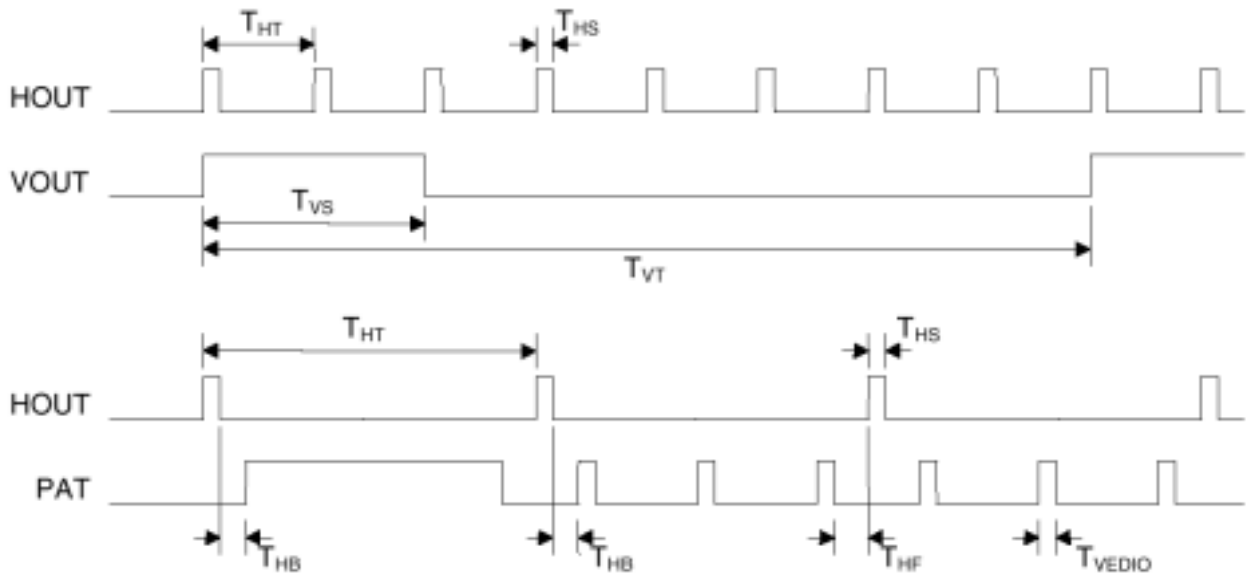
This is designed for finding the vertical frequency bellows 15.25Hz. The program should check REG#17H before reading REG#16H.

Polarity Detect/Control

The polarities of HSYNC and VSYNC are automatically detected and are shown in the H_POL and V_POL bits. The polarities of HSO and VSO are controlled by the HOP and VOP bits. For example, set HOP bit to "1", the HSO pin always outputs positive horizontal sync signal, whatever the HSYNC input's polarity is.

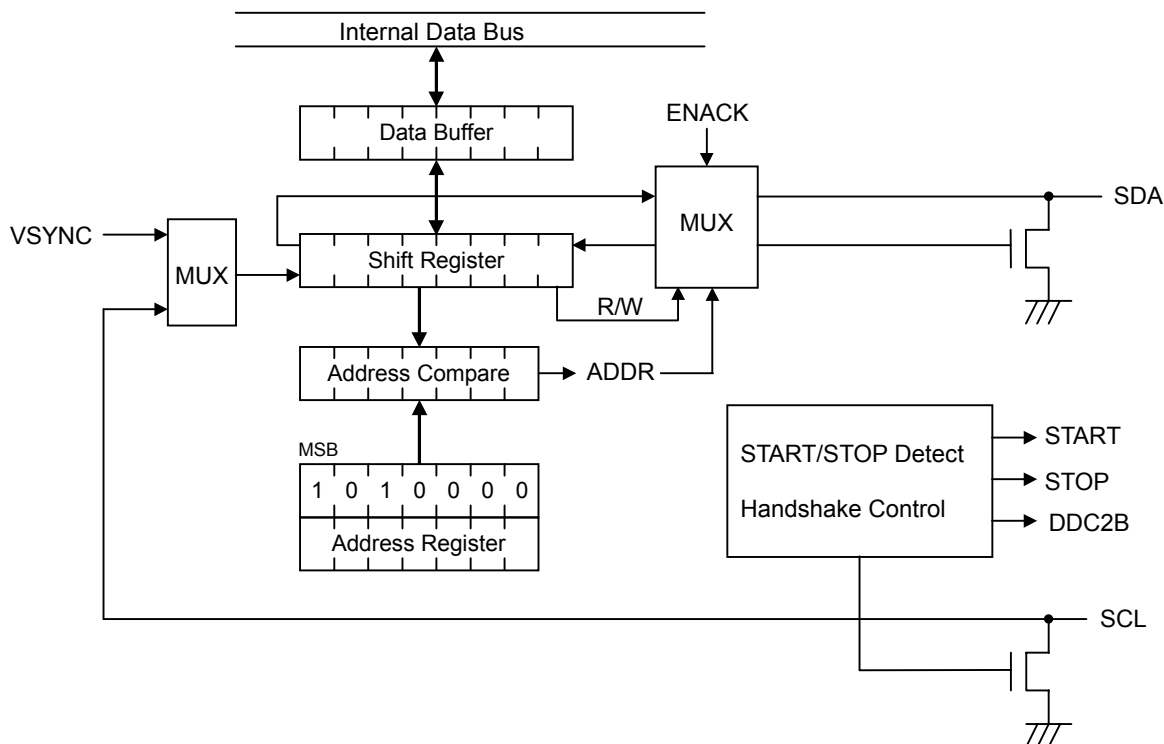
Free-running sync signal and Self-test pattern

| | | Free-running | Self-test |
|-------------|---------------------------------|---------------|---------------|
| F_H | Hor frequency | 48.000KHz | 31.496KHz |
| F_V | Ver frequency | 72.072Hz | 59.993Hz |
| T_{HT} | Hor total time | 20.833us | 31.75us |
| T_{VT} | Ver total time | 13.875ms | 16.669ms |
| T_{HS} | H sync time | 2.417us | 3.833us |
| T_{HB} | H Back porch + H Left border | 1.417us | 2 us |
| T_{HF} | H Front porch + H Right border | 1.125us | 0.708us |
| T_{VS} | V sync time | 6 x T_{HT} | 2 x T_{HT} |
| T_{VB} | V Back porch + V Top border | 23 x T_{HT} | 33 X T_{HT} |
| T_{VF} | V Front porch + V Bottom border | 38 x T_{HT} | 11 x T_{HT} |
| T_{VIDEO} | Video pulse width | 41.67us | 41.67ns |



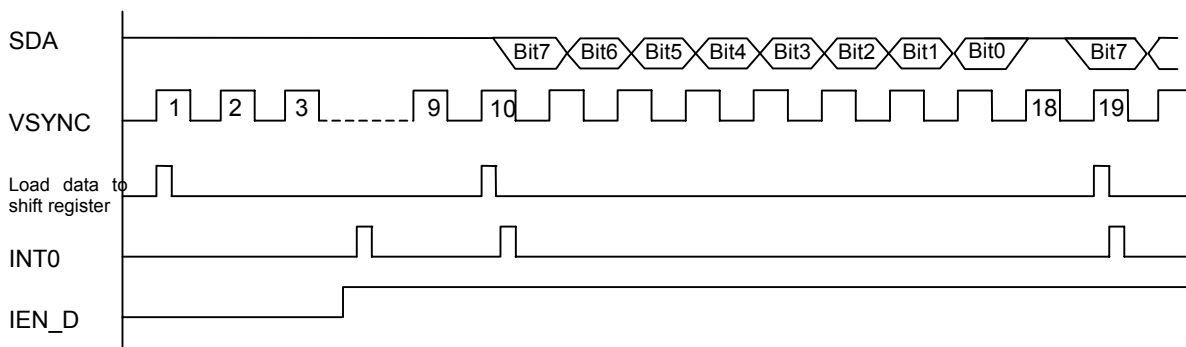
DDC Interface

The DDC interface is a slave mode I²C interface with DDC1 function. It is fully compatible with VESA DDC1/2B standard. The functional block diagram is shown in the below.



After power on or reset the DDC interface, it is in DDC1 state. The shift register shifts out data to SDA pin on the rising edge of VSYNC clock. Data format is an 8-bit byte followed by a null bit. Most significant bit (MSB) is transmitted first. Every time when the ninth bit has been transmitted, the shift register will load a data byte from data buffer (REG#18H). After loading data to the shift register, the data buffer becomes empty and generates an INT0 interrupt. So the program must write one data byte into REG#18 every nine VSYNC clocks.

Since the default values of data buffer (REG#22) and shift register are FFH, the SDA pin outputs high level if no data had been written into data buffer after power on reset. When program finished initialization and set the IEN_D bit to "1", the INT0 will occur because the data buffer is empty. The INT0 service routine should check the DDC2B bit is "0" and then writes the first EDID data byte into data buffer. When the second INT0 occurs, the INT0 service routine writes the second EDID data byte into data buffer and so on.



If a low level occurs on the SCL pin in DDC state, the DDC interface will switch to DDC2B state immediately and set the DDC2B bit to "1". No interrupt will be generated. But, if there is no valid device address and it receives 128 VSYNC pulses while the SCL is high level, it will lock into DDC2B state and disregard VSYNC.

In some case, program wants to go back DDC1 state, set RDDC bit in REG#1AH and reset it again. This operation resets the DDC interface to the initial condition.

When it is in DDC2B state, the VSYNC clock is disregarded and the communication protocol follows the DDC standard. The data format on SDA pin is:

| | | | | | | | | | |
|---|---------|-----|---|----------------|---|--|----------------|---|---|
| S | Address | R/W | A | D7, D6,..., D0 | A | | D7, D6,..., D0 | A | P |
|---|---------|-----|---|----------------|---|--|----------------|---|---|

S: Start condition. A falling edge occurs when SCL is high level.

P: Stop condition. A rising edge occurs when SCL is high level.

A: Acknowledge bit. "0" means acknowledge and "1" means non-acknowledge.

Address: 7-bit device address.

R/W: Read/Write control bit, "1" is read and "0" is write.

D7, D6, ..., D0: data byte.

The hardware operations in DDC2B state are:

(1) START/STOP detection

When the START condition is detected, the DDC interface is enabled and set START bit to "1".

When the STOP condition is detected, the DDC interface is disabled, set STOP bit to "1" and generate INT0 interrupt.

The START bit is cleared when the following data byte received.

The STOP bit is cleared after writing REG#19H.

(2) Address Recognition

It contains two device addresses in WT6132. On fixed address ('1010000') is for EDID reading and one programmable address (REG#19H) is for external control, such as auto alignment.

If the address is equal to "1010000", set ADDR bit to "0".

If the address is equal to the bit A6 to bit A0 (REG#19H), set ADDR bit to "1".

If the address is not equal to anyone above, the DDC interface will not response acknowledge.

The ADDR bit is updated when a new device address is received.

(3) Store R/W bit and decide the direction of SDA pin

The R/W bit on the SDA pin will be stored in the RW bit.

(4) Acknowledge bit control/detection

Acknowledge bit control in receive direction:

If ENACK=1 and address compare is true, response acknowledge (Acknowledge bit ="0").

If ENACK=0 or address compare is false, response non-acknowledge (Acknowledge bit ="1").

Acknowledge bit detect in transmit direction:

If the acknowledge bit is "1", the DDC interface will be disabled and release the SDA pin.

If the acknowledge bit is "0", the DDC interface keeps on communicating.

(5) Data bytes transmit/receive

If the RW bit is "1", the shift register will load data from the data buffer (REG#18H) before the data byte is transmitted and shift out data to the SDA pin before the rising edge of the SCL clock.

If the RW bit is "0", the shift register will shift in data on the rising edge of the SCL clock and the whole data byte is latched to the data buffer (REG#18H).

(6) Handshaking procedure

The handshaking is done on the byte level. The DDC interface will hold the SCL pin low after the acknowledge bit automatically. The bus master will be forced to wait until the WT6018 is ready for the next byte transfer. To release the SCL pin, write REG#19H will release clear the wait state.

(7) Interrupt INT0

The DDC interface interrupt is enabled by setting the IEN_D bit in the REG#1AH.

Interrupt INT0 occurs when:

- Transmit buffer empty in DDC1 state.

The INT0 occurs when the shift register load data from data buffer.

Write REG#18H will clear the transmit buffer empty condition.

- Acknowledge is detected in DDC2B state.

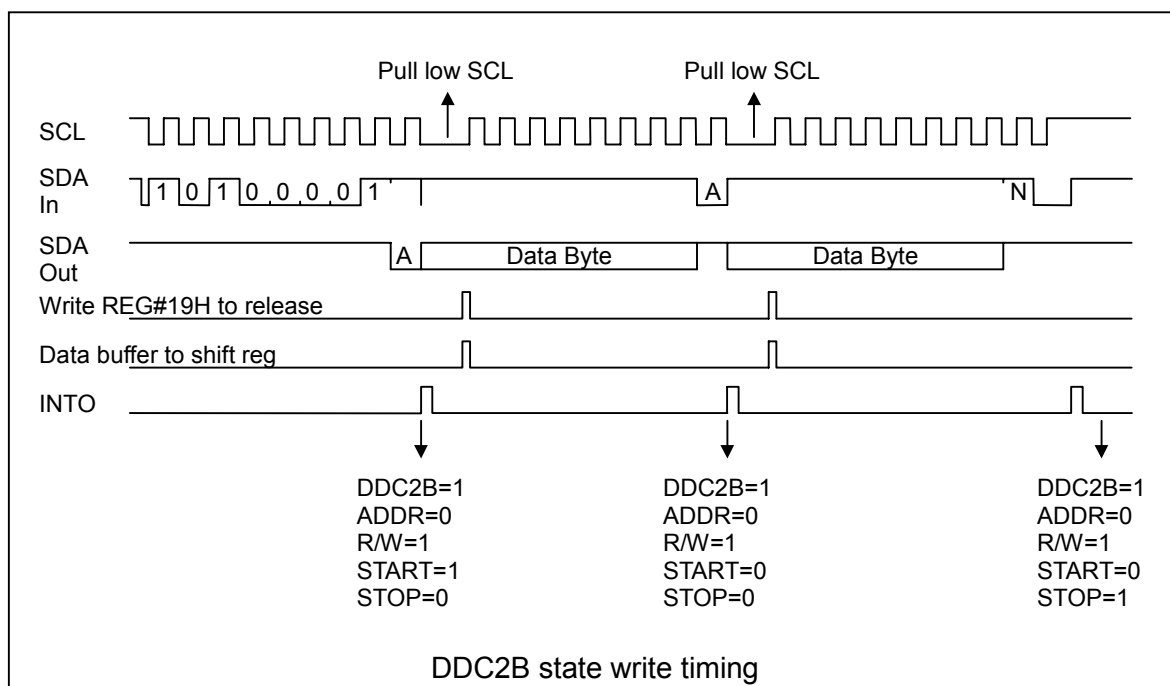
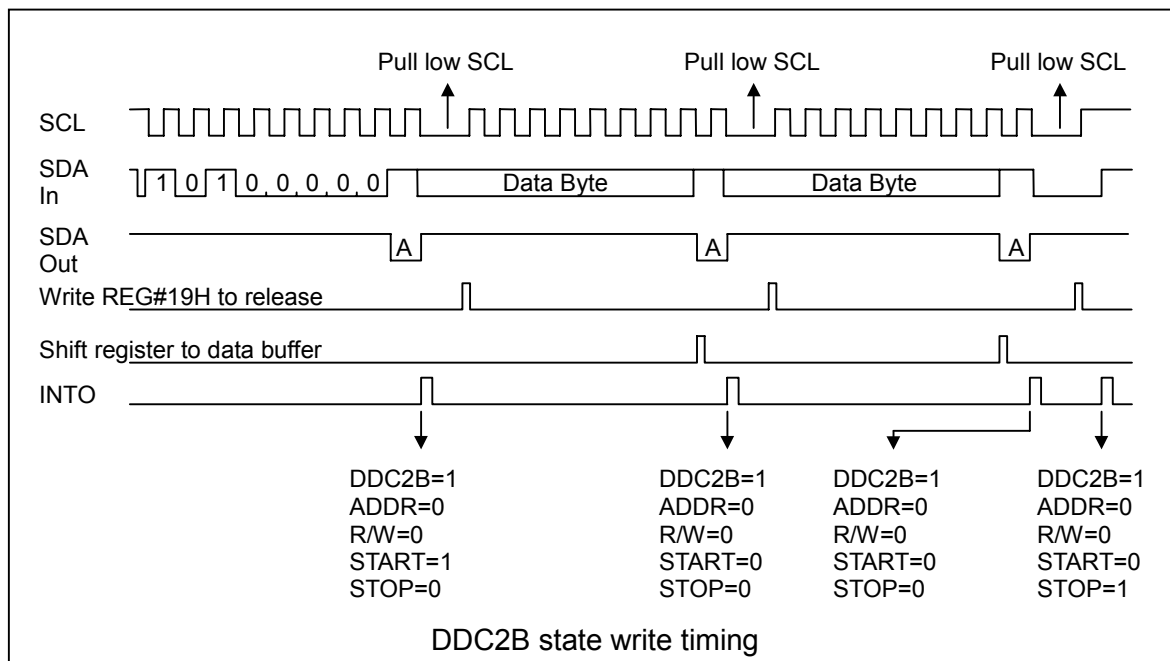
The INT0 occurs on the falling edge of the SCL clock after the acknowledge had been detected.

The SCL pin will be pulled low to force the bus master to wait until the service routine write REG#19H.

- STOP condition occurs in DDC2B mode

| Address | R/W | Initial | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|-----|---------|-------|------|------|-------|------|------|------|-------|
| 0018H | R/W | FFH | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 0019H | R | 40H | DDC2B | ADDR | R/W | START | STOP | -- | -- | -- |
| 0019H | W | A0H | A6 | A5 | A4 | A3 | A2 | A1 | A0 | ENACK |

| Bit Name | Bit value = "1" | Bit value = "0" |
|------------------|---|--------------------------------------|
| DDC2B | DDC2B state. | DDC1 state. |
| ADDR | Received address equals to the address in REG#19H(W). | Received address equals to '1010000' |
| RW | Received R/W bit is '1' | Received R/W bit is '0' |
| START | START condition is detected. | No START condition is detected. |
| STOP | STOP condition is detected. | No STOP condition is detected. |
| ENACK | Enable acknowledge. | Disable acknowledge. |
| A6, A5, ... , A0 | 7-bit slave address | |
| D7, D6, ... , D0 | Data to be transmitted or received data. | |



3. 2-wire serial CMOS EEROPM

Features

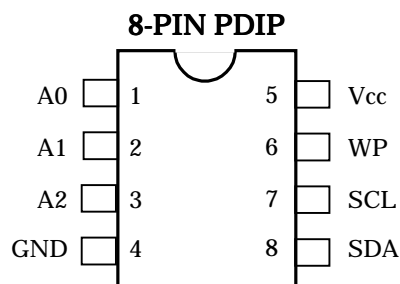
- Low Voltage and Standard Voltage Operation
Vcc = 4.5 V to 5.5 V
- Internally Organized 512 x 8 (4K)
- Two-wire Serial Interface
- Bidirectional Data Transfer Protocol
- Wire Protect Pin for Hardware Data Protection
- 16-byte Page Write Modes
- Partial Page Write Cycle (10 ms max)
- High Reliability
Endurance: 100,000 Cycles
Extended Endurance Devices Available
Data Retention: 100 years
- Automotive Grade and Extended Temperature Device Available
- Eight-Pin and 14-Pin JEDEC SOIC and Eight-Pin PDIP Packages

Description

The AT24C04 provides 4096 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 512 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C04 is available in space saving eight-pin PDIP, eight-pin and fourteen-pin SOIC packages and is accessed via a two-wire serial interface. The AT24C01A/02/04/08/16 is guaranteed for 100,000 erase/wire cycles and 100 year data retention.

Pin Configurations

| Pin Name | Function |
|----------------------------------|--------------------|
| A ₀ to A ₂ | Address Inputs |
| SDA | Serial Data |
| SCL | Serial Clock Input |
| WP | Write Protect |
| NC | No Connect |

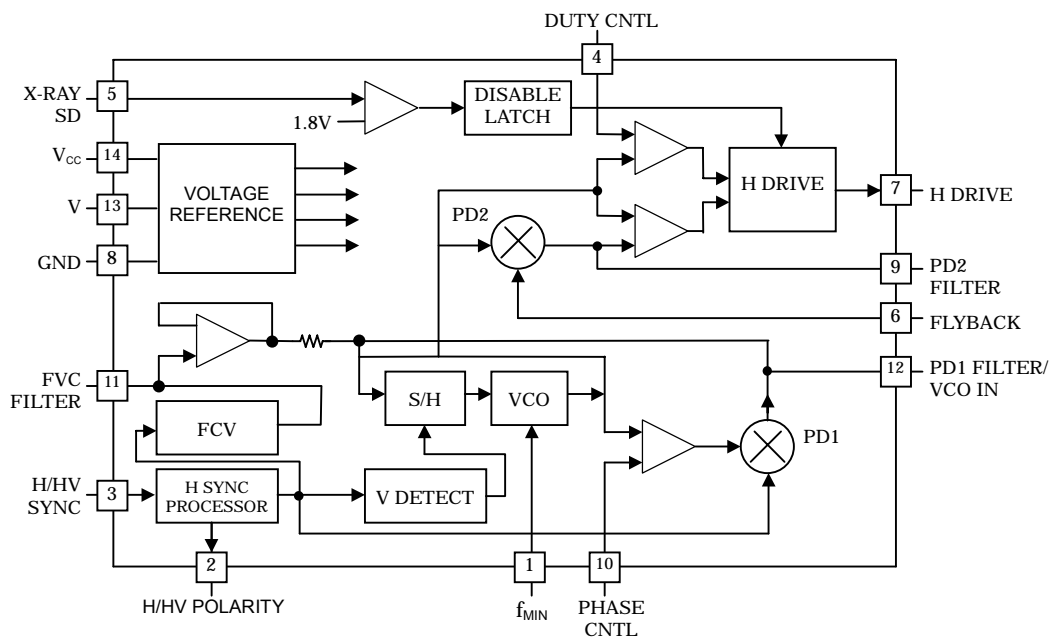


4. Horizontal deflection signal processing

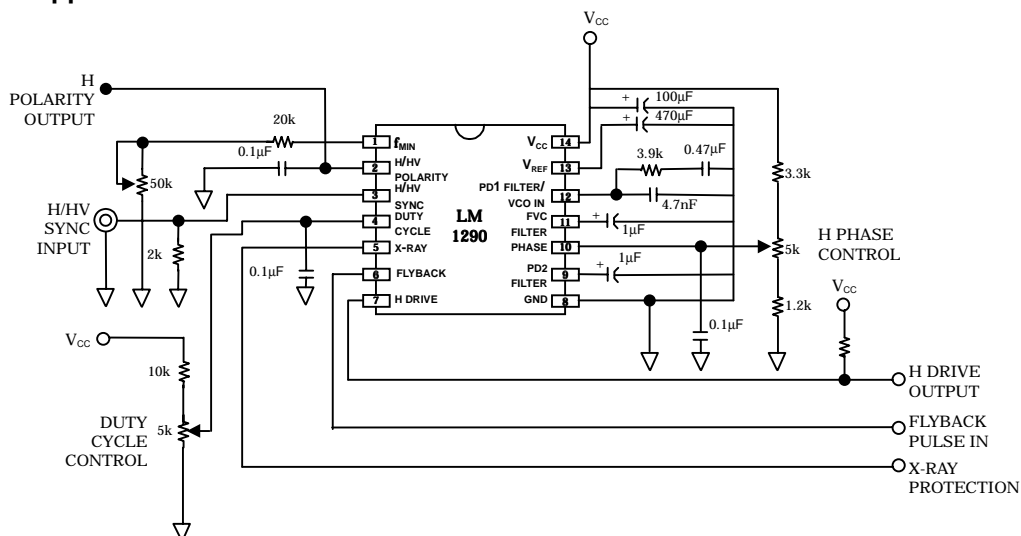
LM1290:

1. Full-automatic synchronization from 22 kHz to 90 kHz. No component changeover nor external adjustment is required.
2. DC control H phase and duty cycle.
3. The resistance corresponds to the frequency programmable down to VCO.
4. X-ray input invalid.
5. H-drive invalid due to low VCC (when $VCC < 9.5V$). The H OUT transistor is protected as a result.
6. The capacitor protects the H output transistor during the change of the scanning mode, by means of the programmable frequency ramming $H \text{ VO}/dt$.

System Block Diagram



Typical Application LM1290



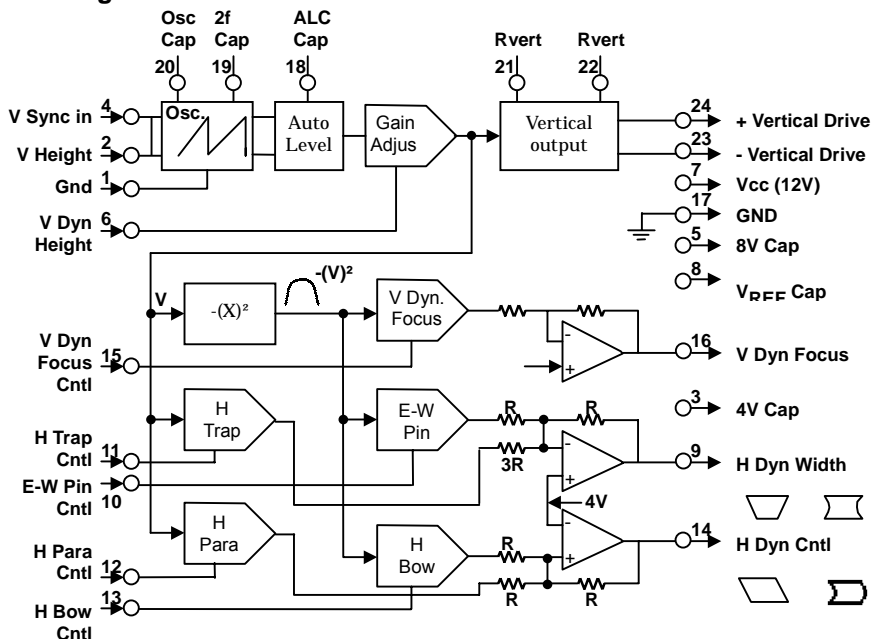
1. PIN 1. fmin: lower limit frequency of this setting. $f_{min} = 5.6 \times 10^8 / (R_{min} \times 500)$
 $f_{min} = 29.1 \text{ kHz}$, $R_{min} = 18.7 \text{ K}\Omega$ (When the frequency is 30kHz or more)
 $f_{min} = 22.8 \text{ kHz}$, $R_{min} = 24 \text{ K}\Omega$ (When the frequency is 24kHz or more)
2. PIN 2. Polarity of H/HV:
 $C_{POL} = 0.1 \mu\text{f}$, $I_o = \pm 1 \mu\text{A}$, $V_o = 1 - e^{-t/RC}$
3. H/HV synchronous input:
When there is compatibility between TTL and CMOS, the H/HV synchronous input is within the 0.35 to 1.85 V range, and the polarity is negative.
4. Power factor control:
 $V_4 = 0 \sim 4 \text{ V} = 70 \text{ to } 30\%$, $10\%/\text{V}$
 $= 2.12 \text{ V typ. (} f_H < 42.6 \text{ kHz) / } 2.00 \text{ V typ. (} f_H > 42.6 \text{ kHz)}$
Duty = $70\% - (V_4 \times 10\%/\text{V}) = 48.8\% / 50.0\%$
5. X-ray shutdown:
Specification: 1.65 to 1.8V shutdown
When B+ HV=25 kV, we have $V_{out} = 25 \text{ V}_{DC}$, therefore, when shutdown HV = 27.5 kV, we have $V_{out} = 30.8 \text{ V}_{DC}$.
When $R_1 = 10.7 \text{ K}\Omega$ and $R_2 = 10 \text{ K}\Omega$, we have shutdown $V_{OL} = 26.8 \text{ to } 28.2 \text{ KV}$.
6. Fly-back input threshold voltage:
Spec. : $5 \text{ V}_{p-p} < V_6 < V_{cc}$, $V_{cc} = 12 \text{ V}$
 $R_{338} = 24 \text{ K}\Omega$, $V_6 = \text{approx. } 11 \text{ V}_{p-p}$.
7. Horizontal drive:
Low level current: Minimum 100mA
Low level voltage: Maximum 0.4V
48.36KHz: $T_{on} = 11.01 \mu\text{s}$, $T_{off} = 9.66 \mu\text{s} : 53.28\%$
8. Pin 10 H-PHASE control:
Control gain = 8.89% TH/V
Minimum control Range = $\pm 22\% T_N$
 $V_{10} = 3.8 \sim 6.8 \text{ V}$ $f = 31.5 \text{ kHz}$, Range = $\pm 7.9 \mu\text{s}$
 $f = 64 \text{ kHz}$, Range = $\pm 3.9 \mu\text{s}$
9. Vref: Vref specification = 8.2 VDC
10. FVC filter:
 $FVC = 0.052 \text{ V/kHz}$ $V_{11} \quad 31.5 \text{ KHz to } 64 \text{ KHz} = 1.734 \text{ to } 3.53 \text{ V}$

5. Vertical compensation and geometrical compensation of the raster

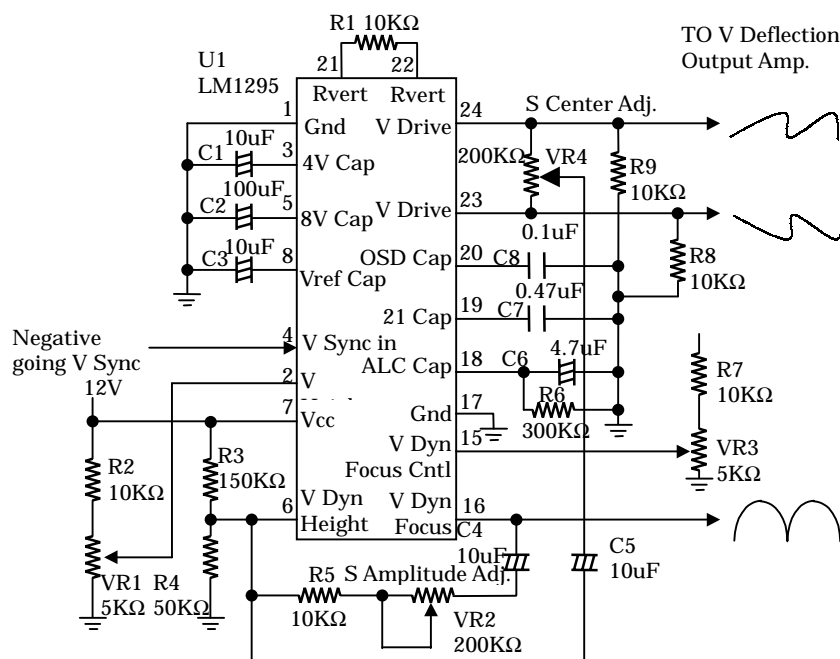
LM1295:

1. Vertical scanning frequency : 50 to 100Hz.
2. DC control compensation amplitude
3. Temperature stability of the vertical amplitude : 1%.
4. Dynamic vertical deflection compensation corresponding to the secondary anode voltage drop.
5. Positive and negative compensation signals.

Block Diagram



LM1295 Application



1. V-Height (Pin-2):
The amplitudes of the +V and –V drive currents are controlled by means of the 0V to 4V voltage of this pin. The current can be raised by raising the voltage.
2. 4V CAP (Pin 3):
4V CAP (capacitor), should be connected 10 uF capacitor between pin3 and GND(pin17).
3. V-Sync in (Pin 4)
The vertical synchronization input is a negative TTL level pulse, and it has the function of locking the vertical oscillator. The input threshold levels is approximately 2V. The pulse has a minimum width of approximately 200 ns.
4. 8V CAP (Pin 5):
8V CAP (capacitor), should be connected 100uF capacitor between pin5 and GND(pin17).
5. V-Dyn Height (Pin 6):
The amplitude of the driving currents of the voltages +V and –V are controlled by means of the 3V to 4V voltage of this pin.
6. H-Dyn Height (Pin 9):
This output is expressed by the sum of the vertical ramp and the parabola resulting from that ramp. The amplitude and the polarity of the ramp signal is controlled by H TRAP CNTRL (Pin 11), and the amplitude and polarity of the parabola is controlled by E-W PIN CNTRL (PIN 10), both in the DC-control mode.
7. E-W PIN CNTRL (Pin 10):
This is the E-W direction pincushion deformation control function, and the voltage range is within the 0V-4V range. When the voltage falls within the 2V-4V range, the amplitude increases, and the parabola becomes positive. On the other hand, when the voltage falls within the 0V-2V range, the parabola becomes negative.
8. TRAP CNTRL (Pin 11):
This is the trapezoid control function, and the voltage is within the 0V-4V range. When the voltage falls within the 2V-4V range, the amplitude increases, and the ramp becomes positive. On the other hand, when the voltage falls within the 0V-2V range, the ramp becomes negative.
9. Parallelogram control (Pin 12):
The voltage is within the 0V to 4V range. When the voltage falls within the 2V-4V range, the ramp, the ramp becomes positive.
One the other hand, when the voltage falls within the 0V-2V range, the ramp becomes negative.
10. Bow shape control (Pin 13):
The voltage is within the 0V-4V range. When the voltage falls within the 2V-4V range, the parabola becomes positive. On the other hand, when the voltage falls within the 0V-2V range, the parabola becomes negative.

11. Output of the parabola and bow-shaped parabola (Pin 14):

The amplitude and the polarity of the ramp signal are controlled by means of the PARA CNTRL (Pin 12), and the amplitude and polarity of the parabola are controlled by the BOW CNTRL (PIN 13).

In both cases, the control is carried out in the DC mode.

12. V Dyn Focus control (Pin 15):

The voltage is within the 0V to 4V range. When the voltage falls within the 2V-4V range, the parabola becomes positive. On the other hand when the voltage falls within the 0V-2V range, the parabola becomes negative.

13. V Dyn Focus (Pin 16)

14. ALC Cap (Pin 18):

This is the Automatic level Controller (ALC) capacitor, and the recommended value is 4.7 μF .

15. Frequency doubling capacitor:

This is the vertical oscillator that locks at a frequency twice as high as the vertical synchronization frequency. Its capacitance is 0.47 μF .

16. OSC Cap (Pin 20):

The value of the capacitance is 0.1 μF .

17. Rvert (Pin 21/22):

The vertical resistor has the function of determining the gain of the vertical ramp current generator.

18. -V drive (Pin 23) and +V drive (PIN 24):

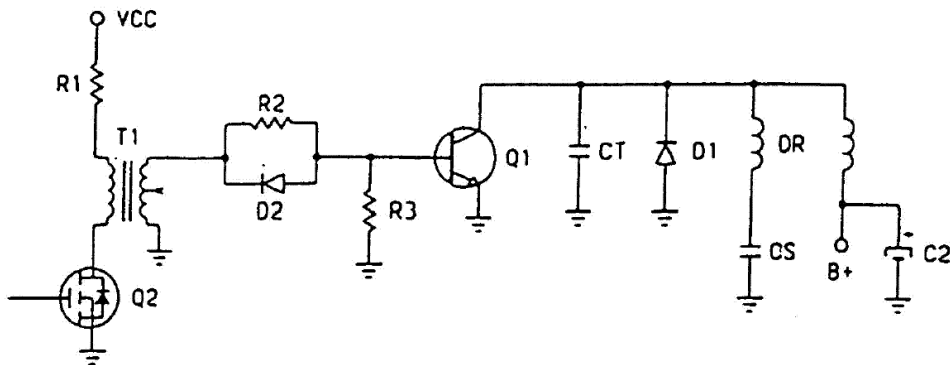
-V is the negative portion of the vertical ramp output current of the object of the operation.

The ramp current waveform is superimposed on the DC current of the approximately 315 μA .

The voltage corresponding to the output (typically 10 $\text{k}\Omega$) is typically 6V.

6. Horizontal drive and power supply output

Circuit Diagram



Description of the circuit:

- 1) R1, T1 and Q2 compose the horizontal driving circuit, and the transistor Q1 generates a horizontal output through the driving signal.

$$I_{B1} = I_{CPMAX}/Q1h_{feMIN}$$

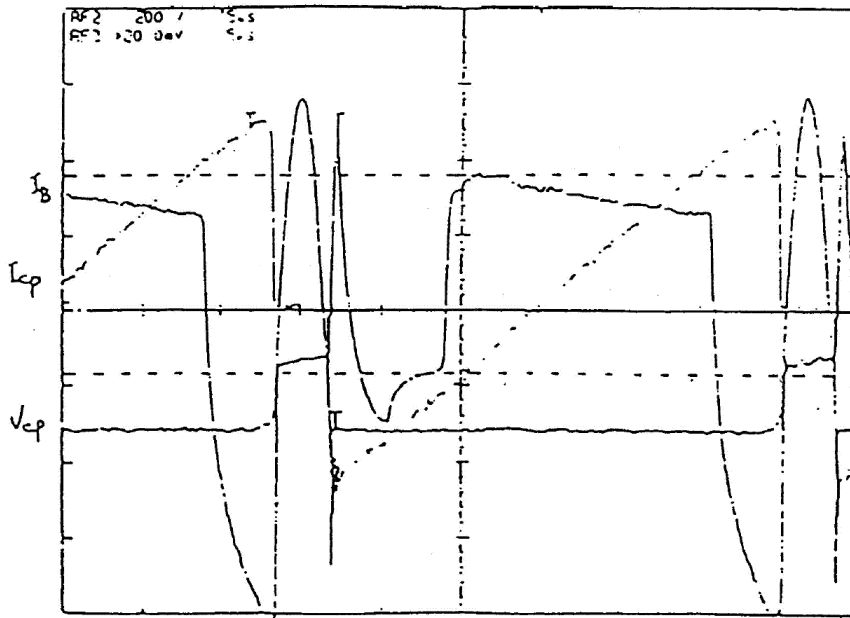
$$I_{B2} \approx 3I_{B1}$$

$$di/dt \approx 3.3A/\mu s$$

- 2) The resistor R2 corrects the current I_{B1} , the resistor R3 works as a damping resistor and leak resistor, and the diode D2 works as a discharging device and polar body.

As long as the transistor Q1 is OFF, the discharge is accelerated and the storage time (T_{stg}) is shortened.

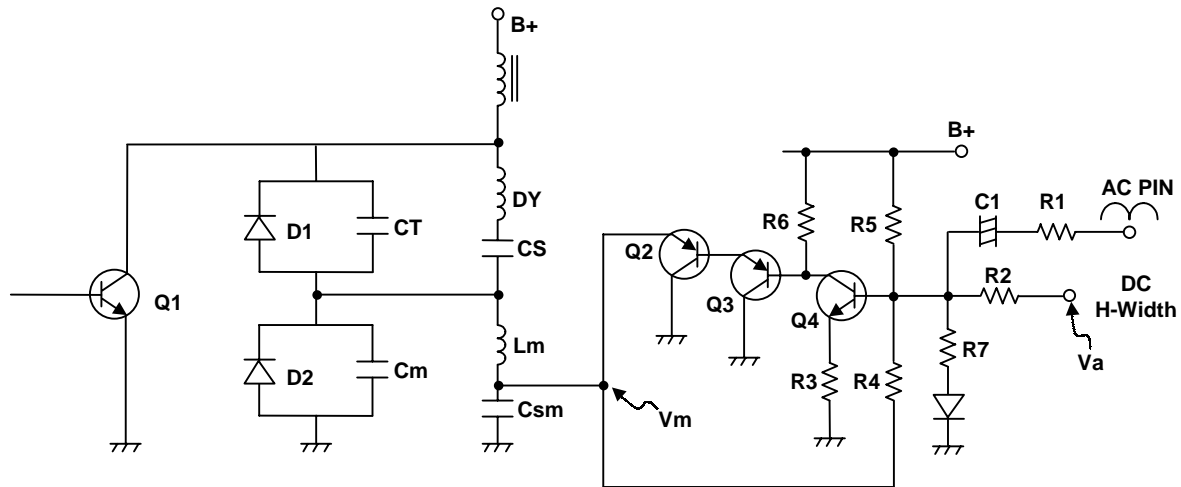
- 3) H-OUT circuit waveform



Time 5μS/div

7. Horizontal amplitude control

Circuit Diagram



Description of the circuit:

- 4) The diodes D1 and D2 compose the bipolar modulation circuit, and have the function of controlling the currents of the coils DY(I_{pp}) and $L_m(I_m)$ through voltage modulation carried out by utilizing V_m .

$$B+ = V_m + V_{cs} \quad \text{Therefore, } V_{cs} = (I_y * L_y)/t_s \rightarrow I_y = (V_{cs} * t_s)/L_y, \text{ with } B+ \text{ fixed.}$$

Such being the case, the horizontal width decreases when $V_m \uparrow \rightarrow V_{cs} \downarrow \rightarrow I_y \downarrow$

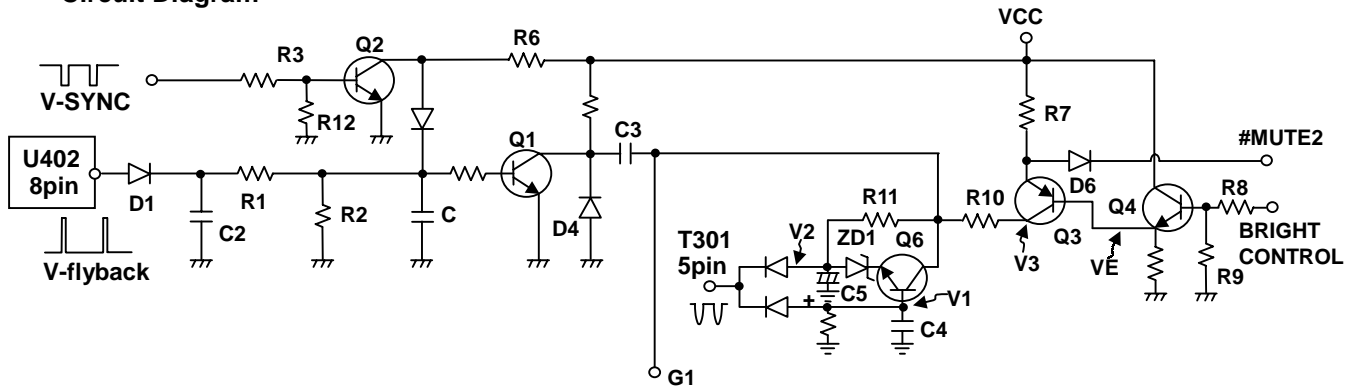
Inversely, the horizontal width decreases when $V_m \downarrow \rightarrow V_{cs} \uparrow \rightarrow I_y \uparrow$

$$(B+ = (V_p * 2T_r)/(\pi * T_s), T_r = \sqrt{L_y C_t}, T_m = \sqrt{L_m C_m})$$

- 5) Q2, Q3 and Q4 compose the control circuit of H-WIDTH. Of those devices, the transistor Q2 and Q3 compose the Darlington current amplifier, and on the other hand the transistor Q4 and the operational amplifier U1 compose the emitter-coupled circuit, that stabilize the voltage and control the current.
- 6) The horizontal width broadens when $V_a \uparrow \rightarrow V_m \downarrow$. An inference in the opposite sense is also possible.

8. Blanking and spot killer

Circuit Diagram



Description of the circuit:

- 1) The vertical blanking circuit completes by Q1, Q2 and peripheral circuit.
The vertical sync pulse applied to R3, R12 connected to Q2 base. Q2 is invert amplifier, then mixer with Q1 base together for compensate vertical retrace time of the blanking pulse.
- 2) The vertical flyback pulse through D1, C2, R1, R2 make waveform forming and clamp. Then applied to Q1 base, the vertical blanking amplifier of the Q1, through C3 coupling to G1 control circuit. D4 for over voltage protect.
- 3) The Q6 is spot killer protect circuit, in normal power off stage.
 $V1 = V2$ and ZD1, so Q6 off. The CRT G1 voltage is fixed at $-10 \sim -100\text{VDC}$ with vertical blanking pulse 28Vpp . $V_{G1} = - (V \times R11) / (R10 + R11)$, ($V = V1 - V3$).
When power off the voltage $V1 > V2$, then Q6 turn on pulling V_{G1} to -150V to protect CRT.
- 4) When Mute set to lower the Q3 off $G1 = -150\text{V}$ screen cut off no picture display, this mute circuit makes active, at power ON/OFF and when mode change stage.
- 5) Q4 bias set up by MCU to control the VCE bias of Q3, then control G1 voltage output.

Test points for maintenance:

- 1) Check D1, R3 and Q1 collector
- 2) G1 voltage control range = $-10 \sim -100\text{VDC}$
G1 off momentary voltage $\approx -150\text{VAC}$

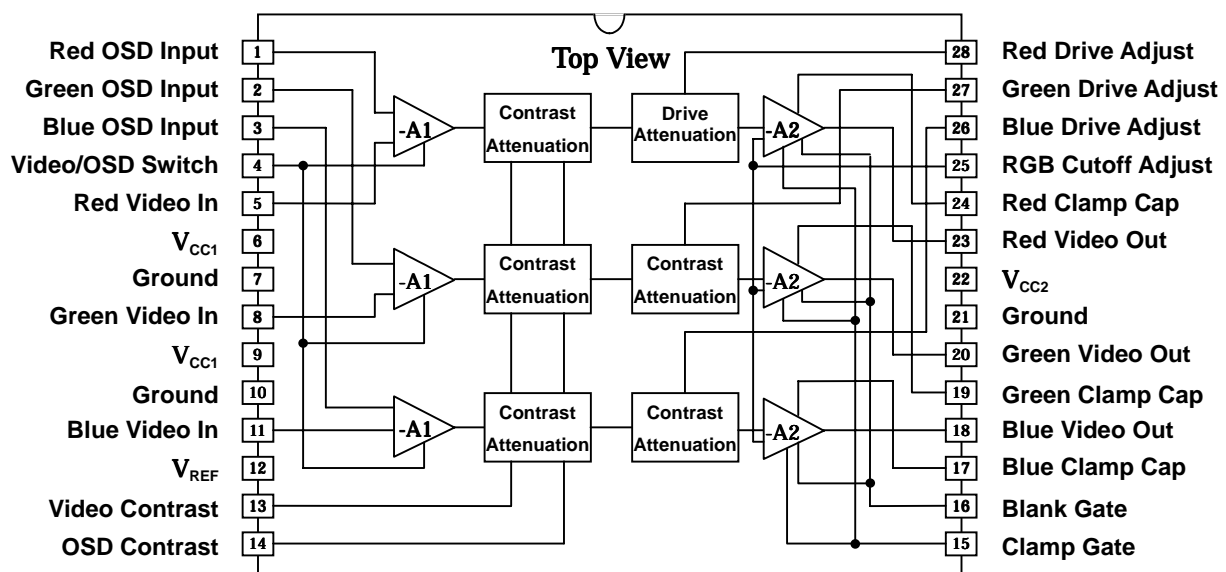
9. Video amplifier system with on-screen display

LM1281 (U201)

Outstanding features:

- * Three-channel video amplifier bandwidth 85 MHz @ -3 dB (4 Vp-p output)
- * OSD TTL input, bandwidth 50 MHz
- * High-speed video/OSD changeover
- * High impedance DC contrast control above the 0-4V, 40dB range
- * High impedance DC OSD contrast control above the 0-4V, 40dB range

BLOCK AND CONNECTION DIAGRAM



Description of the functions

Figure 1 shows the block diagram of LM1281, in conformity with the pin layout of the IC.

Every channel accepts both the video signal and the OSD signal at the input amplifier (A1).

Also the video/OSD changeover signal passes either the video signal or the OSD signal through LM1281, or is connected with the input amplifier for control purposes. The next contrast adjustment block is a drive adjustment type one.

The reference level for the DC return circuit is set by means of the RGB cutoff adjustment pin (PIN 25).

Attention must be paid to the fact that the blank clamp gate is active when it is stuck at the LOW state.

Under ordinary circumstances, these pins are controlled by means of the standard TTL signal.

Test Circuits

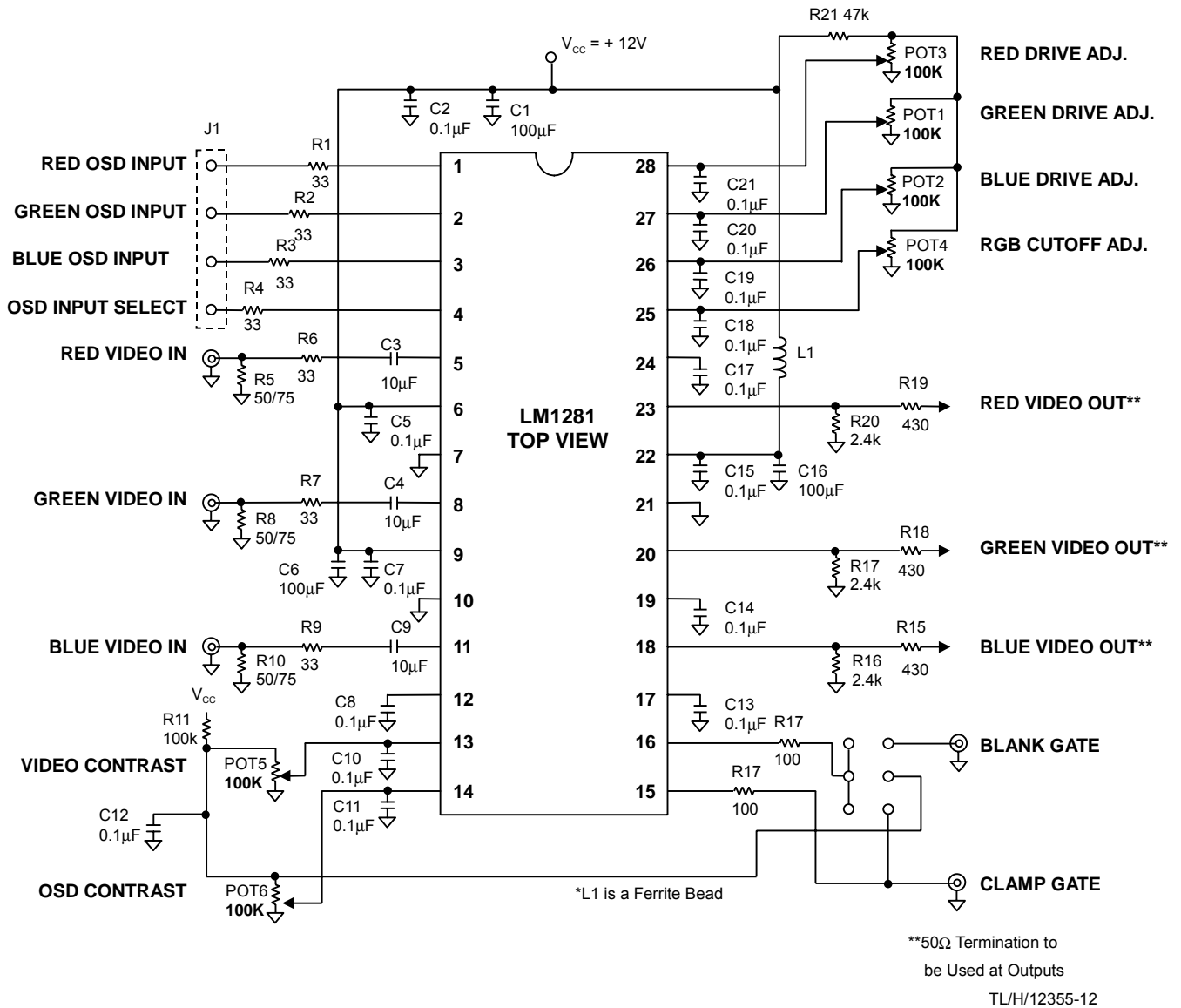


FIGURE 2 LM1281 OSD Video Preamp Demonstration Board Schematic

10. Monolithic triple 9.5ns CRT driver

General Description

The LM2439 is an integrated high voltage CRT driver circuit designed for use in color monitor applications. The IC contains three high input impedance, wide band amplifiers which directly drive the RGB cathodes of a CRT. Each channel has its gain internally set to -14 and can drive CRT capacitive loads as well as resistive loads present in other applications, limited only by the package's power dissipation.

The IC is packaged in an industry standard 9-lead TO-220 molded plastic power package. See Thermal Considerations section.

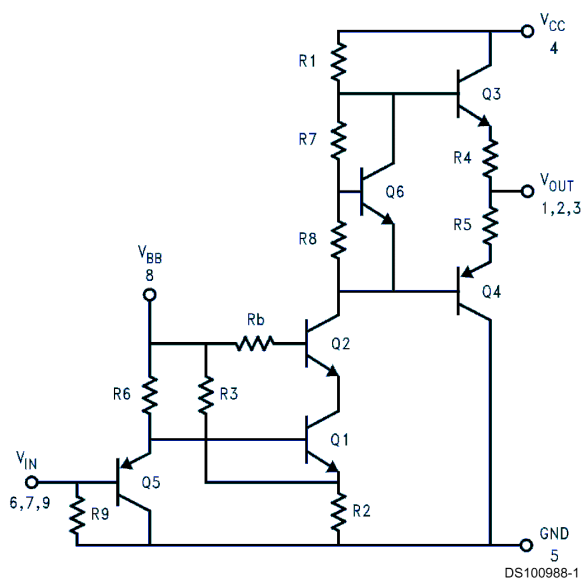
Features

- Dissipates approximately 50% less power than the LM2406
- Well matched with LM1279 video preamp
- 0V to 5V input range
- Stable with 0 pF–20 pF capacitive loads and inductive peaking networks
- Convenient TO-220 staggered lead package style
- Standard LM243X Family Pinout which is designed for easy PCB layout

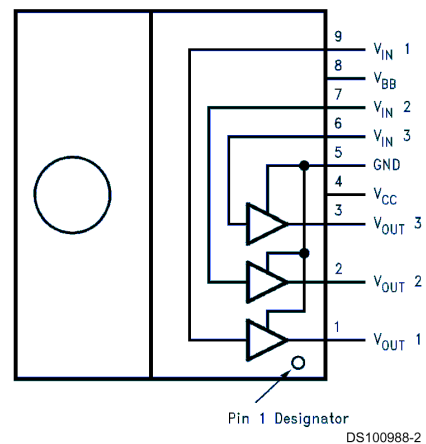
Applications

- 1024 x 768 Displays up to 70 Hz Refresh
- Pixel clock frequencies up to 75 MHz
- Monitors using video blanking

Schematic and Connection Diagrams



**FIGURE 1. Simplified Schematic Diagram
(One Channel)**



Note: Tab is at GND

**Top View
Order Number LM2439T**

Theory of Operation

The LM2439 is a high voltage monolithic three channel CRT driver suitable for high resolution display applications. The LM2439 operates with 80V and 12V power supplies. The part is housed in the industry standard 9-lead TO-220 molded plastic power package.

The circuit diagram of the LM2439 is shown in Figure 1. The PNP emitter follower, Q5, provides input buffering. Q1 and Q2 form a fixed gain cascode amplifier with resistors R1 and R2 setting the gain at -14. Emitter followers Q3 and Q4 isolate the high output impedance of the cascode stage from the capacitance of the CRT cathode which decreases the sensitivity of the device to load capacitance. Q6 provides bi-asing

to the output emitter follower stage to reduce crossover distortion at low signal levels. Figure 2 shows a typical test circuit for evaluation of the LM2439. This circuit is designed to allow testing of the LM2439 in a 50Ω environment without the use of an expensive FET probe. In this test circuit, two low inductance resistors in series totaling 4.95 κΩ form a 100:1 wide band, low capacitance probe when connected to a 50Ω coaxial cable and a 50W load (such as a 50Ω oscilloscope input). The input signal from the generator is ac coupled to the base of Q5.

Application Hints

INTRODUCTION

National Semiconductor (NSC) is committed to provide application information that assists our customers in obtaining the best performance possible from our products. The following information is provided in order to support this commitment. The reader should be aware that the optimization of performance was done using a specific printed circuit board designed at NSC. Variations in performance can be realized due to physical changes in the printed circuit board and the application. Therefore, the designer should know that component value changes may be required in order to optimize performance in a given application. The values shown in this document can be used as a starting point for evaluation purposes. When working with high bandwidth circuits, good layout practices are also critical to achieving maximum performance.

IMPORTANT INFORMATION

The LM2439 performance is targeted for the VGA (640 x 480) to XGA (1024 x 768, 70 Hz refresh) resolution market. It is designed to be a replacement for discrete CRT drivers. The application circuits shown in this document to optimize performance and to protect against damage from CRT arcover are designed specifically for the LM2439. If another member of the LM243X family is used, please refer to its datasheet.

POWER SUPPLY BYPASS

Since the LM2439 is a wide bandwidth amplifier, proper power supply bypassing is critical for optimum performance. Improper power supply bypassing can result in large overshoot, ringing or oscillation. A 0.01 μF capacitor should be connected from the supply pin, VCC, to ground, as close to the supply and ground pins as is practical. Additionally, a 10 μF to 100 μF electrolytic capacitor should be connected from the supply pin to ground. The electrolytic capacitor should also be placed reasonably close to the LM2439's supply and ground pins. A 0.1 μF capacitor should be connected from the bias pin, VBB, to ground, as close as is practical to the part.

ARC PROTECTION

During normal CRT operation, internal arcing may occasionally occur. Spark gaps, in the range of 200V, connected from the CRT cathodes to CRT ground will limit the maximum voltage, but to a value that is much higher than allowable on the LM2439. This fast, high voltage, high energy pulse can damage the LM2439 output stage. The application circuit shown in Figure 9 is designed to help clamp the voltage at the output of the LM2439 to a safe level. The clamp diodes, D1 and D2, should have a fast transient response, high peak current rating, low series impedance and low shunt capacitance. FDH400 or equivalent diodes are recommended. Do not use 1N4148 or equivalent diodes for the clamp diodes. D1 and D2 should have short, low impedance connections to VCC and ground respectively. The cathode of D1 should be located very close to a separately decoupled bypass capacitor (C3 in Figure 9). The ground connection of D2 and the de-coupling capacitor should be very close to the LM2439 ground. This will significantly reduce the high frequency voltage transients that the LM2439 would be subjected to during an arcover condition. Resistor R2 limits the arcover current that is seen by the diodes while R1 limits the current into the LM2439 as well as the voltage stress at the outputs of the device. R2 should be a 1/2W solid carbon type resistor. R1 can be a 1/4W metal or carbon film type resistor. Having large value resistors for R1 and R2 would be desirable, but this has the effect of increasing rise and fall times. Inductor L1 is critical to reduce the initial high frequency voltage levels that the LM2439 would be subjected to. The inductor will not only help protect the device but it will also help maximize rise and fall times as well as minimize EMI. For proper arc protection, it is important to not omit any of the arc protection components shown in Figure 9.

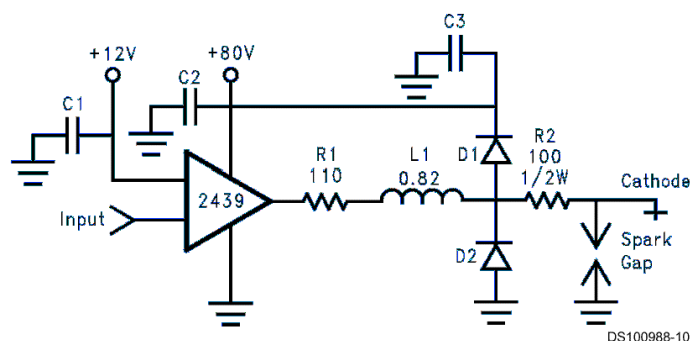


FIGURE 9. One Channel of the LM2439 with the Recommended Application Circuit

OPTIMIZING TRANSIENT RESPONSE

Referring to Figure 9, there are three components (R1, R2 and L1) that can be adjusted to optimize the transient response of the application circuit. Increasing the values of R1 and R2 will slow the circuit down while decreasing overshoot. Increasing the value of L1 will speed up the circuit as well as increase overshoot. It is very important to use inductors with very high self-resonant frequencies, preferably above 300 MHz. Ferrite core inductors from J.W. Miller Magnetics (part # 78FR82K) were used for optimizing the performance of the device in the NSC application board. The values shown in Figure 9 can be used as a good starting point for the evaluation of the LM2439. The NSC demo board also has a position open to add a resistor in parallel with L1. This resistor can be used to help control overshoot. Using variable resistors for R1 and the parallel resistor will simplify finding the values needed for optimum performance in a given application. Once the optimum values are determined the variable resistors can be replaced with fixed values.

EFFECT OF LOAD CAPACITANCE

Figure 8 shows the effect of increased load capacitance on the speed of the device. This demonstrates the importance of knowing the load capacitance in the application.

EFFECT OF OFFSET

Figure 7 shows the variation in rise and fall times when the output offset of the device is varied from 40 VDC to 50 VDC. The rise time shows a maximum variation relative to the center data point (45 VDC) of about 21%. The fall time shows a variation of about 3% relative to the center data point.

THERMAL CONSIDERATIONS

Figure 4 shows the performance of the LM2439 in the test circuit shown in Figure 2 as a function of case temperature. The figure shows that the rise time of the LM2439 increases by approximately 3% as the case temperature increases from 50°C to 100°C. This corresponds to a speed degradation of 0.6% for every 10°C rise in case temperature. The fall time increases by approximately 3% which corresponds to a speed degradation of 0.6% for every 10°C rise in case temperature. Figure 6 shows the maximum power dissipation of the LM2439 vs Frequency when all three channels of the device are driving an 8pF load with a 40 Vp-p alternating one pixel on, one pixel off signal. The graph assumes a 72% active time (device operating at the specified frequency) which is typical in a monitor application. The other 28% of the time the device is assumed to be sitting at the black level (65V in this case). This graph gives the designer the information needed to determine the heat sink requirement for the application. The designer should note that if the load capacitance is increased the AC component of the total power dissipation will also increase. The LM2439 case temperature must be maintained below 115°C. If the maximum expected ambient temperature is 70°C and the maximum power dissipation is 3.4W (from Figure 6, 40MHz bandwidth) then a maximum heat sink thermal resistance can be calculated:

$$R_{TH} = \frac{115^{\circ}\text{C} - 70^{\circ}\text{C}}{3.4\text{W}} = 13^{\circ}\text{C/W}$$

This example assumes a capacitive load of 8pF and no resistive load.

11. On Screen Display

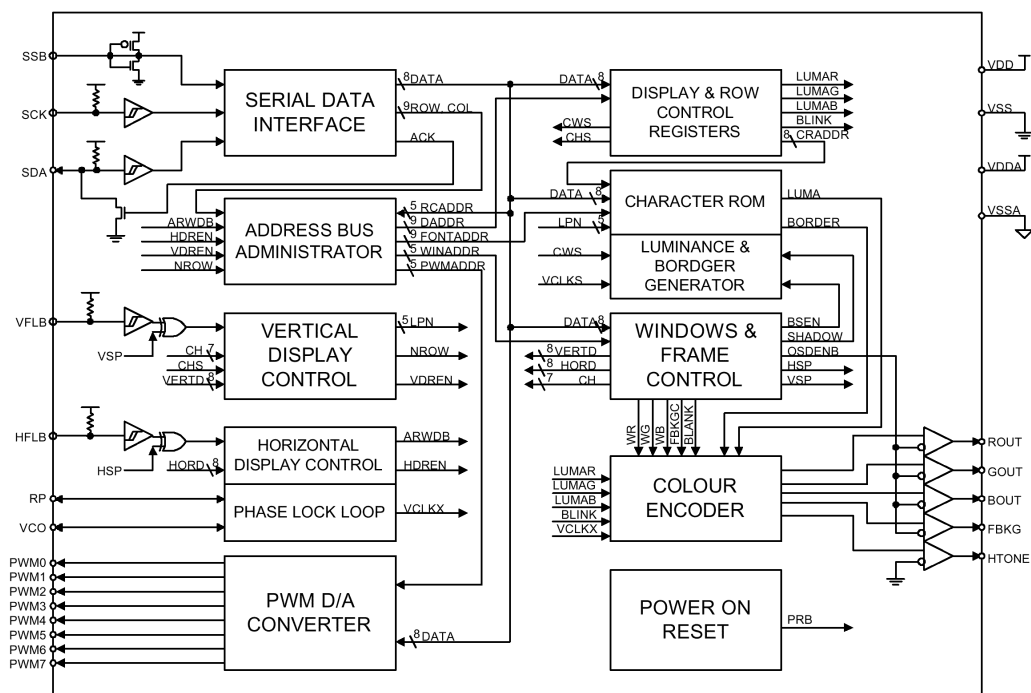
FEATURES

- Horizontal SYNC input up to 130 KHz.
- On-chip PLL circuitry up to 96 MHz.
- Programmable horizontal resolutions up to 1524 dots per display row.
- Full-screen display consists of 15 (rows) by 30 (columns) characters.
- 12 x 18 dot matrices per character.
- Total of 272 characters and graphic fonts, including 256 standard and 16 multi-color mask ROM fonts.
- 8 color-selectable maximum per display character.
- 7 color-selectable maximum for character background.
- Double character height and/or width control.
- Programmable positioning for display screen center.
- Bordering, shadowing and blinking effect.
- Programmable character height (18 to 71 lines) control.
- Row to row spacing register to manipulate the constant display height.
- 4 programmable background windows with multi-level operation and shadowing on window effect.
- Software clears bit for full-screen erasing.
- Half tone and fast blanking output.
- Fade-in/fade-out effect.
- 4-channel/8-bit PWM D/A converter output.
- Compatible with SPI bus or I²C interface with slave address 7AH (slave address is mask option).
- 20-pin PDIP package.

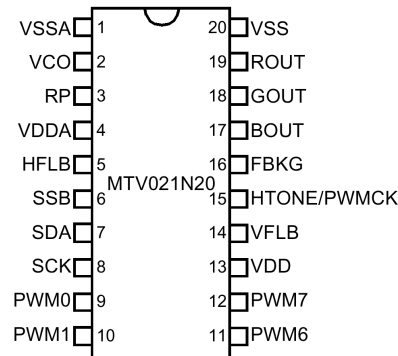
GENERAL DESCRIPTION

MTV021 is designed for monitor applications to display built-in characters or fonts onto monitor screens. The display operation occurs by transferring data and control information from the micro-controller to RAM through a serial data interface. It can execute full-screen display automatically, as well as specific functions such as character background color, bordering, shadowing, blinking, double height and width, font by font color control, frame positioning, frame size control by character height and row-to-row spacing, horizontal display resolution, full-screen erasing, fade-in/fade-out effect, windowing effect and shadowing on window. MTV021 provides 256 standard and 16 multi-color characters and graphic fonts for more efficacious applications. The full OSD menu is formed by 15 rows x 30 columns, which can be positioned any-where on the monitor screen by changing vertical or horizontal delay. Moreover, MTV021 also provides 8 PWM DAC channels with 8-bit resolution and a PWM clock out-put for external digital-to-analog control.

BLOCK DIAGRAM



PIN CONNECTION



PIN DESCRIPTIONS

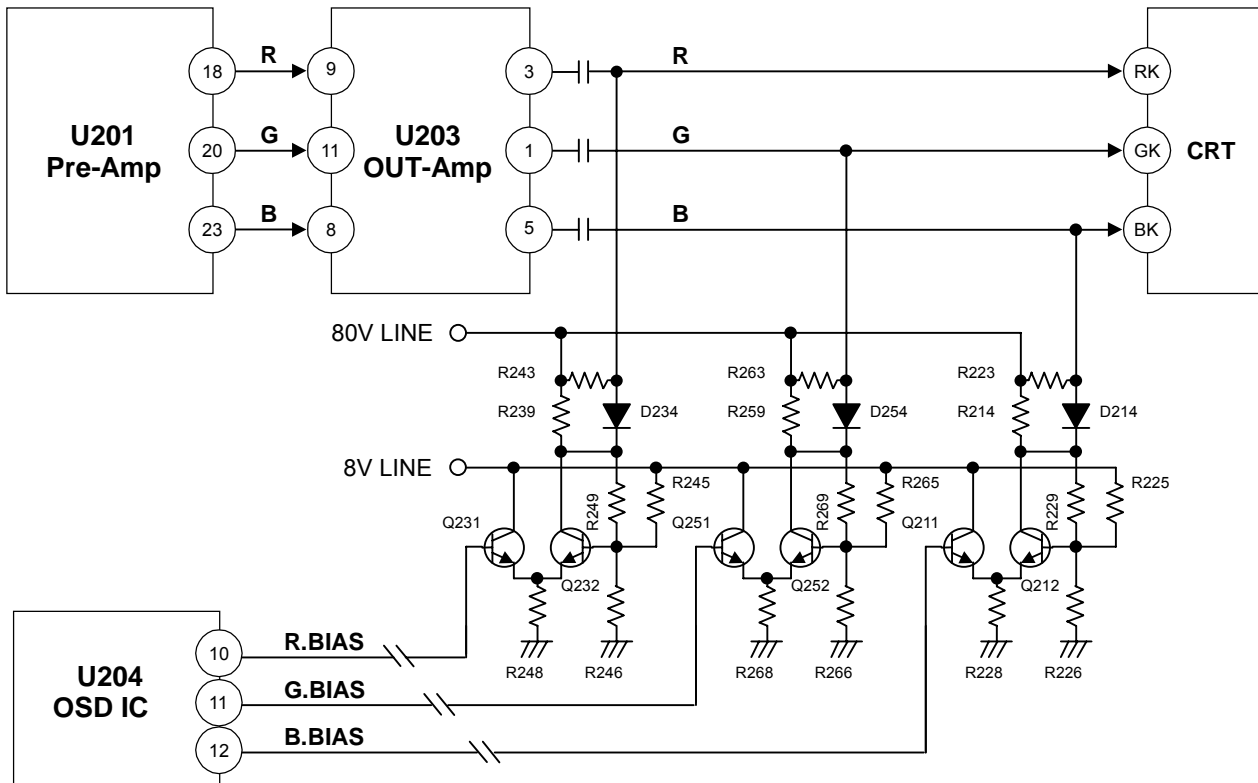
| Name | I/O | Pin # | Descriptions |
|---------------|-----|-------|---|
| VSSA | - | 1 | Analog ground. This ground pin is used to internal analog circuitry. |
| VCO | I/O | 2 | Voltage Control Oscillator. This pin is used to control the internal oscillator frequency by DC voltage input from external low pass filter. |
| RP | I/O | 3 | Bias Resistor. The bias resistor is used to regulate the appropriate bias current for internal oscillator to resonate at specific dot frequency. |
| VDDA | - | 4 | Analog power supply. Positive 5V DC supply for internal analog circuitry. And a 0.1uF decoupling capacitor should be connected across to VDDA and VSSA. |
| HFLB | I | 5 | Horizontal input. This pin is used to input the horizontal synchronizing signal. It is a leading edge triggered and has an internal pull-up resistor. |
| SSB | I | 6 | Serial interface enable. It is used to enable the serial data and is also used to select the operation of I ² C or SPI bus. If this pin is left floating, I ² C bus is enabled, otherwise the SPI bus is enabled. |
| SDA | I | 7 | Serial data input. The external data transfer through this pin to internal display registers and control registers. It has an internal pull-up resistor. |
| SCK | I | 8 | Serial clock input. The clock-input pin is used to synchronize the data transfer. It has an internal pull-up resistor. |
| PWM0 | O | 9 | Open-Drain PWM D/A converter 0. The output pulse width is programmable by the register of Row 15, Column 23. |
| PWM1 | O | 10 | Open-Drain PWM D/A converter 1. The output pulse width is programmable by the register of Row 15, Column 24. |
| PWM2 | O | 11 | Open-Drain PWM D/A converter 6. The output pulse width is programmable by the register of Row 15, Column 29. |
| PWM3 | O | 12 | Open-Drain PWM D/A converter 7. The output pulse width is programmable by the register of Row 15, Column 30. |
| VDD | - | 13 | Digital power supply. Positive 5 V DC supply for internal digital circuitry and a 0.1uF decoupling capacitor should be connected across to VDD and VSS. |
| VFLB | I | 14 | Vertical input. This pin is used to input the vertical synchronizing signal. It is leading triggered and has an internal pull-up resistor. |
| HTONE / PWMCK | O | 15 | Half tone output / PWM clock output. This is a multiplexed pin selected by PWMCK bit. This pin can be a PWM clock or used to attenuate R, G, B gain of VGA for the transparent windowing effect. |
| FBKG | O | 16 | Fast Blanking output. It is used to cut off external R, G, B signals of VGA while this chip is displaying characters or windows. |
| BOUT | O | 17 | Blue color output. It is a blue color video signal output. |
| GOUT | O | 18 | Green color output. It is a green color video signal output. |
| ROUT | O | 19 | Red color output. It is a red color video signal output. |
| VSS | - | 20 | Digital ground. This ground pin is used to internal digital circuitry. |

12. Video Bias Control Circuit

The video signals are amplified to about 45Vp-p by U203 and then the signals are biased by BIAS CONTROL CIRCUIT which is controlled by U701 through U204.

The raster brightness is determined by black level at CRT cathode which is clamping DC level of the cathode of D214, D234 and D254.

The clamping DC level is determined by R/G/B bias which is controlled by U701 through U204b respectively.



13. Moire Cancellation Circuit

Moire cancellation circuit consists of the circuit of U3A1 and others. A horizontal synchronization signal (HD) is inputted into pin11 of U3A1, and the pulse wave form of the frequency of the half of the signal is outputted from pin9 of U3A1. The wave form of pin8 is the reversal wave form of pin9.

Similarly, a vertical synchronization signal (VD) is inputted into pin3 of U3A1, and the pulse wave form of the frequency of the half of the signal is outputted from pin5 of IC3A1. The wave form of pin6 is the reversal form of pin5.

Q3A3 is turned on and turned off by these.

The amplitude of the collector wave form of Q3A3 is controlled by DAC of H_MOIRE.

The effect level of Moire cancellation changes by this amplitude.

The collector signal of Q3A3 is add to U301 pin10 (H.phase control) through C309.

REPLACEMENT PARTS LIST

The components specified for Model FE700(N9705)(A)

| SYMBOL | PART NO | DESCRIPTION |
|--------|---------|-------------|
|--------|---------|-------------|

*** CRT ***

| | | |
|-----|----------|-----------------|
| CRT | 33017606 | CRT M41LPE21X14 |
|-----|----------|-----------------|

*** ICS ***

| | | |
|------|----------|---------------------------|
| U101 | 79PQ0050 | IC LINEAR KA3842A 8P |
| U102 | 79PQ0051 | IC LINEAR KA3843B 8P |
| U201 | 79PQ0307 | IC LM1281 |
| U203 | 79PQ1431 | N.S VIDEO DRIVE IC LM2439 |
| U204 | 79PQ1435 | OSD IC MTV021N20 FOR CN95 |
| U301 | 79PQ0052 | IC LM1290 |
| U3A1 | 79PQ1438 | IC 74HC74 |
| U401 | 79PQ0036 | IC TDA4866 10P |
| U402 | 79PQ0037 | IC LM1295 |
| U701 | 79PQ1434 | MTP MCU WT62P1 FOR CN954 |
| U702 | 79PQ0048 | IC AT24C04(ATMEL) |

*** TRANSISTORS ***

| | | |
|------|----------|---------------------------|
| Q101 | 79PQ1248 | FET N 2SK2545 TO-220F |
| Q102 | 79PQ0064 | FET N YTAF630 TO-220F |
| Q103 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q104 | 79PQ1246 | TR PNP KSB772 TO-126 |
| Q105 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q106 | 79PQ1245 | TR NPN KSC 2328A TO-92(T) |
| Q107 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q108 | 79PQ1247 | TR PNP KSA 928A TO-92(T) |
| Q109 | 79PQ1244 | TR NPN KSP44 TO 92(T) |
| Q110 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q111 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q113 | 79PQ0057 | TR NPN 2SC1213AC TO-92(T) |
| Q115 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q117 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q201 | 79PQ0057 | TR NPN 2SC1213AC TO-92(T) |
| Q211 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q212 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q231 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q232 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q251 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q252 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q301 | 79PQ0059 | TR NPN PH2369 TO-92(T) |
| Q302 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q303 | 79PQ0812 | TRNPN 2SC4002 TO-92(T) |
| Q304 | 79PQ0811 | TR NPN BF422 TO-92(T) |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| Q305 | 79PQ0061 | TR PNP BF423 TO-92(T) |
| Q306 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q307 | 79PQ1364 | TOSHIBA 2SC5411(HFE) |
| Q308 | 79PQ1249 | TR 2SK2961 FET |
| Q310 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q313 | 79PQ0064 | FET N YTAF630 TO-220F |
| Q314 | 79PQ0060 | TR PNP 2SB861C TO-220 |
| Q315 | 79PQ0061 | TR PNP BF423 TO-92(T) |
| Q316 | 79PQ0055 | TR NPN 2SD667AC TO-92(T) |
| Q317 | 79PQ1247 | TR PNP KSA 928A TO-92(T) |
| Q318 | 79PQ1245 | TR NPN KSC 2328A TO-92(T) |
| Q320 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q322 | 79PQ0064 | FET N YTAF630 TO-220F |
| Q323 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q324 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A1 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A2 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A3 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A4 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q401 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q402 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q601 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q603 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q604 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q605 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q606 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q70A | 79PQ0062 | TR PNP 2SA733P TO-92(T) |

*** DIODES ***

| | | |
|------|----------|---------------------------|
| D101 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D102 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D103 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D104 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D105 | 79PQ0066 | DIODE/T 1A BA159 |
| D106 | 79PQ0067 | DIODE/T 1A 1N4002 |
| D107 | 79PQ0065 | DIODE T" 1N4148" |
| D108 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D109 | 79PQ0065 | DIODE T" 1N4148" |
| D110 | 79PQ1238 | DIODE 600V/1.6A RG2A |
| D111 | 79PQ0721 | DIODE/A 3A RG4A (SANKEN) |
| D112 | 79PQ0794 | DIODE/A 2A/600V RG4A |
| D113 | 79PQ0798 | DIODE 3A/200V RG4Z |
| D114 | 79PQ0721 | DIODE/A 3A RG4A (SANKEN) |
| D115 | 79PQ0065 | DIODE T" 1N4148" |
| D117 | 79PQ0065 | DIODE T" 1N4148" |
| D120 | 79PQ0065 | DIODE T" 1N4148" |
| D126 | 79PQ0065 | DIODE T" 1N4148" |
| D127 | 79PQ0065 | DIODE T" 1N4148" |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| D128 | 79PQ0065 | DIODE T" 1N4148" |
| D129 | 79PQ0065 | DIODE T" 1N4148" |
| D130 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D133 | 79PQ0065 | DIODE T" 1N4148" |
| D134 | 79PQ0065 | DIODE T" 1N4148" |
| D136 | 79PQ0065 | DIODE T" 1N4148" |
| D201 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D202 | 79PQ0065 | DIODE T" 1N4148" |
| D203 | 79PQ0065 | DIODE T" 1N4148" |
| D204 | 79PQ0065 | DIODE T" 1N4148" |
| D205 | 79PQ0065 | DIODE T" 1N4148" |
| D210 | 79PQ0065 | DIODE T" 1N4148" |
| D211 | 79PQ0065 | DIODE T" 1N4148" |
| D213 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D214 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D230 | 79PQ0065 | DIODE T" 1N4148" |
| D231 | 79PQ0065 | DIODE T" 1N4148" |
| D233 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D234 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D250 | 79PQ0065 | DIODE T" 1N4148" |
| D251 | 79PQ0065 | DIODE T" 1N4148" |
| D253 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D254 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D301 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D302 | 79PQ0065 | DIODE T" 1N4148" |
| D303 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D304 | 79PQ0065 | DIODE T" 1N4148" |
| D305 | 79PQ1250 | DIODE STKY/T 1A/60V SB160 |
| D306 | 79PQ0065 | DIODE T" 1N4148" |
| D307 | 79PQ0070 | DIODE/A 5TUZ47 |
| D308 | 79PQ0721 | DIODE/A 3A RG4A (SANKEN) |
| D309 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D30A | 79PQ0065 | DIODE T" 1N4148" |
| D310 | 79PQ0065 | DIODE T" 1N4148" |
| D311 | 79PQ0065 | DIODE T" 1N4148" |
| D312 | 79PQ1251 | DIODE/T 1A 1N4937 |
| D313 | 79PQ0065 | DIODE T" 1N4148" |
| D314 | 79PQ0065 | DIODE T" 1N4148" |
| D315 | 79PQ0065 | DIODE T" 1N4148" |
| D318 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D319 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D321 | 79PQ1251 | DIODE/T 1A 1N4937 |
| D322 | 79PQ1251 | DIODE/T 1A 1N4937 |
| D323 | 79PQ0065 | DIODE T" 1N4148" |
| D324 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D325 | 79PQ0065 | DIODE T" 1N4148" |
| D34A | 79PQ0065 | DIODE T" 1N4148" |
| D3A1 | 79PQ0065 | DIODE T" 1N4148" |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| D3A2 | 79PQ0065 | DIODE T" 1N4148" |
| D4A1 | 79PQ0065 | DIODE T" 1N4148" |
| D4A2 | 79PQ0065 | DIODE T" 1N4148" |
| D601 | 79PQ0065 | DIODE T" 1N4148" |
| D602 | 79PQ0065 | DIODE T" 1N4148" |
| D604 | 79PQ0065 | DIODE T" 1N4148" |
| D605 | 79PQ0065 | DIODE T" 1N4148" |
| D701 | 79PQ0065 | DIODE T" 1N4148" |
| D704 | 79PQ0065 | DIODE T" 1N4148" |
| ZD101 | 79PQ0078 | ZEN DIODE 1/2W(T) 18V |
| ZD102 | 79PQ0077 | ZEN DIODE 1/2W(T) 12A2 |
| ZD103 | 79PQ0078 | ZEN DIODE 1/2W(T) 18V |
| ZD104 | 79PQ1441 | ZEN DIODE 1/2W(T) HZS6B2 |
| ZD105 | 79PQ1252 | ZEN DIODE 1/2W(T) HZS20.2 |
| ZD301 | 79PQ0077 | ZEN DIODE 1/2W(T) 12A2 |
| ZD303 | 79PQ0075 | ZEN DIODE 1/2W(T) 5C2 |
| ZD701 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD702 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD703 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD704 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD706 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |

*** TRANSFORMERS ***

| | | |
|------|----------|---------------------------|
| T101 | 79PQ1440 | POWER X'FM ERL35 500UH(3. |
| T301 | 79PQ1361 | 17FBT DOUBLE FOCUS" |
| T302 | 79PQ0030 | H.DRIVE X'FM 4.5MH EI-19 |
| T303 | 79PQ1240 | TRANS, H.DF X'FM EI-19 |

*** VARIABLE RESISTORS ***

| | | |
|-------|----------|---------------------------|
| VR101 | 79PQ0195 | VR CARBON 6MM10K VZ067TL1 |
| VR102 | 79PQ0194 | VR CARBON 6MM 1K |
| VR302 | 79PQ0195 | VR CARBON 6MM10K VZ067TL1 |
| VR307 | 79PQ1076 | VR CARBON 6MM 200K BM |

*** RELAYS & SWITCHES ***

| | | |
|-------|----------|------------------------|
| SW101 | 79PQ0974 | POWER SW ESB92S21B TV5 |
| SW701 | 79PQ1437 | TACT SW SKHHQV |
| SW702 | 79PQ1437 | TACT SW SKHHQV |
| SW703 | 79PQ1437 | TACT SW SKHHQV |
| SW704 | 79PQ1437 | TACT SW SKHHQV |
| SW705 | 79PQ1437 | TACT SW SKHHQV |
| SW706 | 79PQ1437 | TACT SW SKHHQV |
| SW707 | 79PQ1437 | TACT SW SKHHQV |

*** PWB ASSYS ***

| | | |
|--|----------|---------------|
| | 849E9B01 | SUB PWB ASSY |
| | 849E9F01 | MAIN PWB ASSY |
| | 849E9J01 | CRT PWB ASSY |

| SYMBOL | PART NO | DESCRIPTION |
|--------|---------|-------------|
|--------|---------|-------------|

*** COILS & FILTERS ***

| | | |
|-------|----------|---------------------------|
| B101 | 79PQ1104 | BEAD 3.5X4.7/T |
| B102 | 79PQ1233 | BEAD WBR6H-3T-R7K-B5 |
| B104 | 79PQ1104 | BEAD 3.5X4.7/T |
| B105 | 79PQ1104 | BEAD 3.5X4.7/T |
| B106 | 79PQ1104 | BEAD 3.5X4.7/T |
| B107 | 79PQ1104 | BEAD 3.5X4.7/T |
| B201 | 79PQ1232 | BEAD 3.5*6*0.8/T |
| B208 | 79PQ1232 | BEAD 3.5*6*0.8/T |
| B301 | 79PQ1104 | BEAD 3.5X4.7/T |
| B302 | 79PQ1104 | BEAD 3.5X4.7/T |
| G2WIR | 79PQ0275 | FILTER COIL 20.45X10.2X10 |
| G4WIR | 79PQ0275 | FILTER COIL 20.45X10.2X10 |
| L101 | 79PQ0019 | LINE FILTER ET24 10MH MIN |
| L102 | 79PQ0277 | LINE FILTER UU10.5 1MH |
| L106 | 79PQ1169 | CHOKE COIL 1.3MH |
| L201 | 79PQ0276 | CHOKE COIL 100UH 8X10 |
| L202 | 79PQ0276 | CHOKE COIL 100UH 8X10 |
| L203 | 79PQ1460 | PACKING COIL/T 1.2UH K |
| L204 | 79PQ1460 | PACKING COIL/T 1.2UH K |
| L205 | 79PQ1460 | PACKING COIL/T 1.2UH K |
| L206 | 79PQ1104 | BEAD 3.5X4.7/T |
| L207 | 79PQ1277 | PACKING COIL T 10UH K |
| L303 | 79PQ0806 | CHOKE COIL 130UH 18X20 |
| L305 | 79PQ1235 | H. CENTER CHOKE 5MH 8*20 |
| L306 | 79PQ1366 | LINEARITY COIL 4UH |
| L307 | 79PQ1367 | LINEARITY COIL 3.2UH |
| R157 | 79PQ1104 | BEAD 3.5X4.7/T |
| RL101 | 79PQ1239 | RELAY 12V 6P GSA-SS-212DM |

*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***

| | | |
|--------|----------|---------------------------|
| CRTS | 79PQ1363 | ISDW02S41 CRT SOCKET |
| F101 | 79PQ0799 | FUSE 3.15A/250V 50T |
| LED101 | 79PQ1436 | LED SMLS79723C |
| LED102 | 79PQ1436 | LED SMLS79723C |
| LED103 | 79PQ1436 | LED SMLS79723C |
| P101 | 79PQ0290 | AC SOCKET 3P |
| RL321 | 79PQ0288 | RELAY 12V |
| SG301 | 79PQ1164 | SPAKER GAP 1.5KV |
| TH101 | 79PQ0311 | THERMISTOR NTCR SCK054 |
| TH102 | 79PQ1439 | THERMISTER PTCR PTH451A4R |
| X701 | 79PQ0079 | X'TAL 49U 4MHZ |
| DEG | 6A131701 | DEGAUSSING COIL(110T,15.4 |
| CORD | 70810777 | POWER CORD U-3 L1.8 GRY |
| CABLE | 73893289 | SIGNAL CABLE XH6,7P J-H |

| SYMBOL | PART NO | DESCRIPTION |
|--------|---------|-------------|
|--------|---------|-------------|

*** APPEARANCE PARTS ***

| | | |
|-------|----------|----------------------|
| A4001 | 25431122 | CONTROL PANEL |
| A3001 | 2E324441 | CABINET BACK |
| A3002 | 2E324401 | CABINET FRONT ASSY |
| A4005 | 2E430783 | REVOLVING STAND ASSY |
| A4502 | 2E457941 | PUSH BUTTON(CONTROL) |
| A4501 | 2X456851 | PUSH BUTTON(SW)(B) |
| A5001 | 2E548742 | CHASSIS BASE |

*** PRINTED & PACKING MATERIALS ***

| | | |
|--------|----------|------------------------|
| A8004 | 2E835071 | SHEET,PROTECTION |
| A8001 | 2E837222 | FILLER(T),CARTON |
| A8002 | 2E837232 | FILLER(B),CARTON |
| MANUAL | 78135521 | USER'S MANUAL CN954A |
| A7001 | 2E791061 | NAME PLATE,INSTRUCTION |
| A8003 | 2E838192 | CARTON BOX(CN954A) |

*** RESISTORS ***

| | | |
|------|----------|-------------------------|
| C113 | 79PQ1005 | ELECT 105'C/T 10U/50V |
| R101 | 79PQ0156 | CARBON 1/2W(T) 5% 680K |
| R102 | 79PQ0324 | CARBON 1/4W(T) 5% 100H |
| R103 | 79PQ1261 | MOF 1W/M(B) 5% 15H |
| R104 | 79PQ1448 | MOF 1W/M(A) 5% 1.8H |
| R106 | 79PQ0350 | WOUND RES 5W(B) 5% 22K |
| R107 | 79PQ0328 | CARBON 1/4W(T) 5% 560K |
| R108 | 79PQ0327 | CARBON 1/4W(T) 5% 300K |
| R109 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R110 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R111 | 79PQ0847 | WOUND RES 2W(A)5% 0.15H |
| R112 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R113 | 79PQ0122 | CARBON 1/8W(T) 5% 7.5K |
| R114 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R115 | 79PQ0108 | CARBON 1/8W(T) 5% 39H |
| R116 | 79PQ0132 | CARBON 1/4W(T) 5% 270H |
| R117 | 79PQ0108 | CARBON 1/8W(T) 5% 39H |
| R118 | 79PQ0128 | CARBON 1/4W(T) 5% 20K |
| R119 | 79PQ0116 | CARBON 1/8W(T) 5% 470K |
| R120 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R121 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R122 | 79PQ0091 | CARBON 1/8W(T) 5% 150K |
| R123 | 79PQ0139 | CARBON 1/4W 5% 560H |
| R126 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R127 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R128 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R129 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R130 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R131 | 79PQ1379 | MOF 2W/M(B)5% 5.6H |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|--------------------------|
| R132 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R133 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R134 | 79PQ0340 | MOF 1W/M(A) 5% 10H |
| R135 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R136 | 79PQ0348 | WOUND RES 1W(B) 5% 0.5H |
| R137 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R138 | 79PQ0141 | CARBON 1/4W(T) 5% 75H |
| R139 | 79PQ0155 | CARBON 1/2W(T) 5% 560H |
| R140 | 79PQ0322 | CARBON 1/8W(T) 5% 47H |
| R141 | 79PQ0094 | CARBON 1/8W(T) 5% 20K |
| R142 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R143 | 79PQ0173 | MOF 1W/M(A) 5% 62K |
| R144 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R145 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R146 | 79PQ0095 | CARBON 1/8W(T) 5% 2.2K |
| R147 | 79PQ0093 | CARBON 1/8W(T) 5% 2K |
| R148 | 79PQ1259 | MOF 1W/M(A) 5% 10KH |
| R149 | 79PQ0325 | CARBON 1/4W(T) 5% 150K |
| R151 | 79PQ1262 | MOF 1W/M(B) 5% 470H |
| R152 | 79PQ0321 | CARBON 1/8W(T) 5% 3.3K |
| R153 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R154 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R155 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R156 | 79PQ0726 | RES FUSEABLE 1/2W 1.5H J |
| R158 | 79PQ0732 | RES FUSEABLE 1/4W 47H J |
| R159 | 79PQ0137 | CARBON 1/4W(T) 5% 4.7K |
| R160 | 79PQ0093 | CARBON 1/8W(T) 5% 2K |
| R161 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R163 | 79PQ0125 | CARBON 1/4W 5% 1K |
| R164 | 79PQ1259 | MOF 1W/M(A) 5% 10KH |
| R165 | 79PQ0325 | CARBON 1/4W(T) 5% 150K |
| R169 | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R170 | 79PQ0085 | CARBON 1/8W(T) 5% 1M |
| R177 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R178 | 79PQ0111 | CARBON 1/8W(T) 5% 39K |
| R182 | 79PQ0146 | CARBON 1/2W(T) 5% 1K |
| R190 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R191 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R192 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R1A1 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R1A2 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R1A3 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R201 | 79PQ1443 | CARBON 1/8W(T) 5% 56H |
| R202 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R203 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R204 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R205 | 79PQ0737 | CARBON 1/8W(T) 5% 1.8K |
| R206 | 79PQ0126 | CARBON 1/4W(T) 5% 10K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|--------------------------|
| R208 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R209 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R210 | 79PQ0168 | METAL 1/4W(T) 1% 75H |
| R211 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R212 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R213 | 79PQ0109 | CARBON 1/8W(T) 5% 390H |
| R219 | 79PQ0825 | CARBON 1/2W(T) 5% 10K |
| R220 | 79PQ1177 | CARBON 1/4W(T) 5% 150H |
| R221 | 79PQ1253 | R,CARBON 1/8W(T) 5% 110H |
| R223 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R224 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R225 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R226 | 79PQ0121 | CARBON 1/8W(T) 5% 6.8K |
| R228 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R229 | 79PQ1027 | CARBON 1/8W(T) 5% 91K |
| R230 | 79PQ0168 | METAL 1/4W(T) 1% 75H |
| R231 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R232 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R233 | 79PQ0109 | CARBON 1/8W(T) 5% 390H |
| R239 | 79PQ0825 | CARBON 1/2W(T) 5% 10K |
| R240 | 79PQ1177 | CARBON 1/4W(T) 5% 150H |
| R241 | 79PQ1253 | R,CARBON 1/8W(T) 5% 110H |
| R243 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R244 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R245 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R246 | 79PQ0121 | CARBON 1/8W(T) 5% 6.8K |
| R248 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R249 | 79PQ1027 | CARBON 1/8W(T) 5% 91K |
| R250 | 79PQ0168 | METAL 1/4W(T) 1% 75H |
| R251 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R252 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R253 | 79PQ0109 | CARBON 1/8W(T) 5% 390H |
| R259 | 79PQ0825 | CARBON 1/2W(T) 5% 10K |
| R260 | 79PQ1177 | CARBON 1/4W(T) 5% 150H |
| R261 | 79PQ1253 | R,CARBON 1/8W(T) 5% 110H |
| R263 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R264 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R265 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R266 | 79PQ0121 | CARBON 1/8W(T) 5% 6.8K |
| R268 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R269 | 79PQ1027 | CARBON 1/8W(T) 5% 91K |
| R270 | 79PQ1255 | R,CARBON 1/8W(T) 5% 220H |
| R277 | 79PQ1026 | CARBON 1/8W(T) 5% 82KH |
| R278 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R280 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R282 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R284 | 79PQ0120 | CARBON 1/8W(T) 5% 680H |
| R286 | 79PQ1034 | CARBON 1/4W(T) 5% 330K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| R287 | 79PQ0145 | CARBON 1/2W(T) 5% 100H |
| R288 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R289 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R291 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R292 | 79PQ0324 | CARBON 1/4W(T) 5% 100H |
| R293 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R294 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R295 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R296 | 79PQ0085 | CARBON 1/8W(T) 5% 1M |
| R297 | 79PQ0347 | FUSIBLE MF RES 1/4W 2.2H |
| R2A1 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A2 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A3 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A4 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A5 | 79PQ0738 | CARBON 1/8W(T) 5% 36K |
| R2A6 | 79PQ0738 | CARBON 1/8W(T) 5% 36K |
| R2A7 | 79PQ0738 | CARBON 1/8W(T) 5% 36K |
| R2A8 | 79PQ1016 | CARBON 1/8W(T) 5% 18K |
| R2A9 | 79PQ1016 | CARBON 1/8W(T) 5% 18K |
| R2AA | 79PQ1016 | CARBON 1/8W(T) 5% 18K |
| R2AE | 79PQ1442 | CARBON 1/8W(T) 5% 16K |
| R2AF | 79PQ1442 | CARBON 1/8W(T) 5% 16K |
| R2AH | 79PQ1442 | CARBON 1/8W(T) 5% 16K |
| R300 | 79PQ0399 | CARBON 1/8W(T) 5% 1.3K |
| R301 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R302 | 79PQ1368 | RESISTOR FUSEBLE 1/2W0.47 |
| R303 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R304 | 79PQ0342 | MOF 3W/M(A) 5% 3.3H |
| R305 | 79PQ0085 | CARBON 1/8W(T) 5% 1M |
| R306 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R307 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R308 | 79PQ1444 | CARBON 1/2W(T) 5% 360H |
| R309 | 79PQ0185 | MOF 3W/M(A) 5% 5.6H |
| R30A | 79PQ0321 | CARBON 1/8W(T) 5% 3.3K |
| R30C | 79PQ1051 | METAL 1/4W(T) 1% 22K |
| R310 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R311 | 79PQ0843 | MOF 2W/M(A) 5% 0.82H |
| R312 | 79PQ0170 | MOF 1W/M(A) 5% 27H |
| R313 | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R314 | 79PQ0731 | RES FUSEABLE 1/2W 1.0H J |
| R315 | 79PQ0827 | CARBON 1/2W (T) 5% 1M |
| R316 | 79PQ1180 | MOF 1W/M(A) 5% 1KH |
| R318 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R319 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R321 | 79PQ0153 | CARBON 1/2W(T) 5% 4.7H |
| R322 | 79PQ0086 | CARBON 1/8W(T) 5% 1.2K |
| R323 | 79PQ0340 | MOF 1W/M(A) 5% 10H |
| R324 | 79PQ0340 | MOF 1W/M(A) 5% 10H |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|------------------------|
| R325 | 79PQ0111 | CARBON 1/8W(T) 5% 39K |
| R326 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R327 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R328 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R329 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R32A | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R330 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R331 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R332 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R333 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R334 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R335 | 79PQ1263 | MOF 2W/M(A) 5% 100H |
| R336 | 79PQ1058 | METAL 1/4W(T) 1% 5.6K |
| R337 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R338 | 79PQ0131 | CARBON 1/4W(T) 5% 24K |
| R339 | 79PQ1371 | CARBON 1/8W(T) 5% 68K |
| R340 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R341 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R342 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R343 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R344 | 79PQ0146 | CARBON 1/2W(T) 5% 1K |
| R345 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R346 | 79PQ1445 | METAL 1/4W(T) 1% 1K |
| R347 | 79PQ0837 | METAL 1/4W(T) 1% 6.8K |
| R348 | 79PQ1041 | CARBON 1/2W(T) 5% 470K |
| R349 | 79PQ1449 | MOF 1W/M(A) 5% 33K |
| R34A | 79PQ1059 | METAL 1/4W(T) 1% 56K |
| R351 | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R352 | 79PQ0330 | METAL 1/4W(T) 1% 11.3K |
| R353 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R354 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R355 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R356 | 79PQ0827 | CARBON 1/2W (T) 5% 1M |
| R357 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R358 | 79PQ0091 | CARBON 1/8W(T) 5% 150K |
| R359 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R360 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R361 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R362 | 79PQ0088 | CARBON 1/8W(T) 5% 120K |
| R363 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R364 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R366 | 79PQ1446 | METAL 1/4W(T) 1% 120K |
| R368 | 79PQ0334 | METAL 1/4W(T) 1% 18K |
| R369 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R370 | 79PQ0130 | CARBON 1/4W(T) 5% 220K |
| R371 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R372 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R373 | 79PQ0337 | METAL 1/4W(T) 1% 3.48K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|-------------------------|
| R374 | 79PQ0161 | METAL 1/4W(T) 1% 10K |
| R375 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R376 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R377 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R378 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R379 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R380 | 79PQ0130 | CARBON 1/4W(T) 5% 220K |
| R381 | 79PQ0130 | CARBON 1/4W(T) 5% 220K |
| R382 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R383 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R384 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R386 | 79PQ0161 | METAL 1/4W(T) 1% 10K |
| R388 | 79PQ1447 | METAL 1/4W(T) 1% 604H |
| R389 | 79PQ0833 | METAL 1/4W(T) 1% 13.7K |
| R390 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R391 | 79PQ1450 | MOF 3W/M(A) 5% 27H |
| R392 | 79PQ1375 | METAL 1/4W(T)1% 150K |
| R393 | 79PQ0826 | CARBON 1/2W(T)5%100K |
| R394 | 79PQ0116 | CARBON 1/8W(T) 5% 470K |
| R395 | 79PQ0830 | CARBON 1/2W(T) 5% 56K |
| R3A2 | 79PQ0820 | CARBON 1/8W(T) 5% 56K |
| R3A3 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R3A4 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A5 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A6 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A7 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A8 | 79PQ0110 | CARBON 1/8W(T) 5% 3.9K |
| R3A9 | 79PQ0110 | CARBON 1/8W(T) 5% 3.9K |
| R3AA | 79PQ0086 | CARBON 1/8W(T) 5% 1.2K |
| R3AE | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R3AF | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3AG | 79PQ0089 | CARBON 1/8W(T) 5% 1.5K |
| R3AH | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3AJ | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R3AK | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R401 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R402 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R403 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R408 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R410 | 79PQ0089 | CARBON 1/8W(T) 5% 1.5K |
| R411 | 79PQ0089 | CARBON 1/8W(T) 5% 1.5K |
| R412 | 79PQ0147 | CARBON 1/2W (T) 5% 1H |
| R413 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R414 | 79PQ0129 | CARBON 1/4W(T) 5% 2.2K |
| R415 | 79PQ0743 | RES MOF 1W/M(A) 5% 330H |
| R416 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R418 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R419 | 79PQ0112 | CARBON 1/8W(T) 5% 390K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|--------------------------|
| R420 | 79PQ0091 | CARBON 1/8W(T) 5% 150K |
| R421 | 79PQ0124 | CARBON 1/4W(T) 5% 10H |
| R422 | 79PQ1256 | R,CARBON 1/2W(T) 5% 220H |
| R430 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R432 | 79PQ0125 | CARBON 1/4W 5% 1K |
| R433 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R434 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R440 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R442 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R443 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R444 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R447 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R449 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R450 | 79PQ0820 | CARBON 1/8W(T) 5% 56K |
| R451 | 79PQ0126 | CARBON 1/4W(T) 5% 10K |
| R452 | 79PQ0110 | CARBON 1/8W(T) 5% 3.9K |
| R454 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R455 | 79PQ0104 | CARBON 1/8W(T) 5% 300K |
| R456 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R457 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R460 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R462 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R463 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R477 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R4A1 | 79PQ0323 | CARBON 1/8W(T) 5% 9.1K |
| R601 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R602 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R603 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R604 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R605 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R606 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R608 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R609 | 79PQ0095 | CARBON 1/8W(T) 5% 2.2K |
| R610 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R611 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R612 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R613 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R701 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R704 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R706 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R707 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R70A | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R710 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R712 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R713 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R715 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R717 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R718 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|------------------------|
| R720 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R725 | 79PQ1016 | CARBON 1/8W(T) 5% 18KH |
| R726 | 79PQ1016 | CARBON 1/8W(T) 5% 18KH |
| R728 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R729 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R733 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R739 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R740 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R742 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R743 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R751 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R752 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R753 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R755 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R756 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R761 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R762 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R768 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R769 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R770 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R771 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R772 | 79PQ0737 | CARBON 1/8W(T) 5% 1.8K |
| R773 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |

*** CAPACITORS ***

| | | |
|------|----------|---------------------------|
| C101 | 79PQ0272 | SAFETY X-CAP 0.47U/275V M |
| C102 | 79PQ0273 | SAFE Y-CAP/D 2200P/400V M |
| C103 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C104 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C105 | 79PQ0382 | POWER ELECT 85C 330U/400V |
| C106 | 79PQ1457 | PLASTIC MPE/A 0.1U/250V J |
| C109 | 79PQ0200 | ELECT 85'C/T 100U/25V M |
| C10A | 79PQ1433 | CERAMIC Y5P(B)/T 220P/1KV |
| C110 | 79PQ0238 | CC Y5P(B)/T 470P/50V K |
| C111 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C112 | 79PQ0211 | ELECT 85'C/T 47U/25V M |
| C114 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C115 | 79PQ0256 | MEF CAP BOX 0.0033U/63VJ |
| C116 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C117 | 79PQ0199 | ELECT 85'C/T 100U/16V M |
| C119 | 79PQ0221 | ELECT 105'C/A 100U/100V M |
| C120 | 79PQ0225 | ELECT 105'C/A 220U/100V M |
| C121 | 79PQ1452 | ELECT 85C/A 1000U/35V M |
| C122 | 79PQ1453 | ELECT 105C/A 470U/16V M |
| C123 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C124 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C125 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C126 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C129 | 79PQ1432 | ELECT 105C 47U/250V M LOW |
| C130 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C131 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C132 | 79PQ0758 | MEF CAP BOX 0.033U/50V J |
| C133 | 79PQ0256 | MEF CAP BOX 0.0033U/63VJ |
| C134 | 79PQ0238 | CC Y5P(B)/T 470P/50V K |
| C136 | 79PQ0218 | ELECT 85'C/A 1000U/16V M |
| C137 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C138 | 79PQ0225 | ELECT 105'C/A 220U/100V M |
| C140 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C142 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C143 | 79PQ0264 | PLASTIC MPE/A 0.033U/250V |
| C145 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C146 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C149 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C150 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C151 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C152 | 79PQ1455 | CERAMIC Y5P(B)/T 680P/2KV |
| C154 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C156 | 79PQ0305 | ELECT 105C/T 4.7U/50V M |
| C161 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C162 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C164 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C201 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C202 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C203 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C204 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C205 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C206 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C207 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C209 | 79PQ0204 | ELECT 85'C/T 220U/16V M |
| C20A | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C210 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C213 | 79PQ0213 | ELECT NP/T 1U/100V M |
| C214 | 79PQ1265 | C,ELEC 1UF 100V M |
| C230 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C231 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C233 | 79PQ0213 | ELECT NP/T 1U/100V M |
| C234 | 79PQ1265 | C,ELEC 1UF 100V M |
| C250 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C253 | 79PQ0213 | ELECT NP/T 1U/100V M |
| C254 | 79PQ1265 | C,ELEC 1UF 100V M |
| C267 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C270 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C271 | 79PQ1272 | C,PLASTIC 0.001UF 50V J |
| C272 | 79PQ0854 | CC Y5P(B)/T 470P/500V K |
| C275 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C276 | 79PQ0235 | CC Y5P(B)/T 1000P/1KV K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C277 | 79PQ1381 | CERAMIC Z5V(F)3300PF/1KV |
| C278 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C280 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C281 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C282 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C283 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C284 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C285 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C287 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C288 | 79PQ0224 | ELECT 105'C/T 22U/100V M |
| C289 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C291 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C292 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C293 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C294 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C295 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C296 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C297 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C299 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C2A1 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C2A2 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C2A3 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C2A4 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C302 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C304 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C305 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C306 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C307 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C308 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C309 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C310 | 79PQ1271 | C,CERAMIC 0.01UF 500V Z |
| C312 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C313 | 79PQ1267 | C,ELEC 47UF 50V M |
| C314 | 79PQ0752 | MEF CAP BOX 0.1U/50V J |
| C315 | 79PQ0748 | MEF CAP BOX 0.001U/50V J |
| C316 | 79PQ0763 | MEF CAP BOX 0.0047U/63V J |
| C317 | 79PQ0207 | ELECT 85C/T 0.47U/50V M |
| C318 | 79PQ1383 | PLASTIC PMS/A5600P/2KV J |
| C319 | 79PQ1123 | PLASTIC PPN/A 4700P/800V |
| C320 | 79PQ0204 | ELECT 85'C/T 220U/16V M |
| C323 | 79PQ1266 | C,ELEC 220UF 25V M |
| C324 | 79PQ1266 | C,ELEC 220UF 25V M |
| C325 | 79PQ1269 | C,ELEC 47UF 250V M |
| C326 | 79PQ0255 | MEF CAP BOX 0.22U/63V J |
| C327 | 79PQ1454 | CERAMIC Y5P(B)/T 220P/500 |
| C328 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C329 | 79PQ1125 | PLASTIC MPE/A 0.47U/250V |
| C330 | 79PQ0218 | ELECT 85'C/A 1000U/16V M |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C331 | 79PQ1271 | C,CERAMIC 0.01UF 500V Z |
| C332 | 79PQ1458 | PLASTIC PMM/A 0.33U/400V |
| C333 | 79PQ0261 | PLASTIC MPE/A 1U/250V J |
| C334 | 79PQ0235 | CC Y5P(B)/T 1000P/1KV K |
| C335 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C336 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C337 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C339 | 79PQ0376 | ELECT NP/T 1U/250VM |
| C340 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C341 | 79PQ0854 | CC Y5P(B)/T 470P/500V K |
| C343 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C344 | 79PQ0746 | ELECT 85C/T 4.7U/250V M |
| C350 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C351 | 79PQ0862 | PLASTIC MPPS/A 0.18U/250V |
| C352 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C354 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C356 | 79PQ1101 | PLASTIC MPP/A 0.36U/250V |
| C357 | 79PQ1459 | PLASTIC PMM/A 0.75U/250V |
| C358 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C361 | 79PQ0246 | CQ PEI/T 0.022U/50V J |
| C362 | 79PQ0232 | CERAMIC SL/T 330P/50V J |
| C363 | 79PQ0916 | PLASTIC PEI/T 0.033U/50V |
| C365 | 79PQ0246 | CQ PEI/T 0.022U/50V J |
| C3A2 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C3A3 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C3A4 | 79PQ1451 | ELECT NP/T 1U/50V M |
| C401 | 79PQ1272 | C,PLASTIC 0.001UF 50V J |
| C403 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C404 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C405 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C413 | 79PQ0218 | ELECT 85'C/A 1000U/16V M |
| C415 | 79PQ1268 | C,ELEC 22UF 100V M |
| C416 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C417 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C418 | 79PQ0199 | ELECT 85'C/T 100U/16V M |
| C419 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C420 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C421 | 79PQ0916 | PLASTIC PEI/T 0.033U/50V |
| C423 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C424 | 79PQ0204 | ELECT 85'C/T 220U/16V M |
| C427 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C428 | 79PQ0850 | ELECT 85C/T 0.47U/250VM |
| C431 | 79PQ1084 | ELECT NP/T 100U/16V M |
| C433 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C435 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C437 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C438 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C440 | 79PQ0196 | ELECT 85'C/T 1U/50V M |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C442 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C446 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C447 | 79PQ0207 | ELECT 85C/T 0.47U/50V M |
| C448 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C601 | 79PQ1456 | PLASTIC PEI/T 0.0068U/50V |
| C603 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C604 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C605 | 79PQ0233 | CC Y5P(B)/T 1000P/50V K |
| C702 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C703 | 79PQ0199 | ELECT 85'C/T 100U/16V M |
| C704 | 79PQ0202 | ELECT 85'C/T 2.2U/50V M |
| C705 | 79PQ0231 | CERAMIC SL/T 33P/50V J |
| C706 | 79PQ0231 | CERAMIC SL/T 33P/50V J |
| C707 | 79PQ0229 | CERAMIC SL/T 100P/50V J |
| C708 | 79PQ0229 | CERAMIC SL/T 100P/50V J |
| C724 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C725 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C726 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C727 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C728 | 79PQ0198 | ELECT 85'C/T 10U/50V M |

REPLACEMENT PARTS LIST

The components specified for Model FE700(N9705)(B)

| SYMBOL | PART NO | DESCRIPTION |
|--------|---------|-------------|
|--------|---------|-------------|

*** CRT ***

| | | |
|-----|----------|-----------------|
| CRT | 33017606 | CRT M41LPE21X14 |
|-----|----------|-----------------|

*** ICS ***

| | | |
|------|----------|---------------------------|
| U101 | 79PQ0050 | IC LINEAR KA3842A 8P |
| U102 | 79PQ0051 | IC LINEAR KA3843B 8P |
| U201 | 79PQ0307 | IC LM1281 |
| U203 | 79PQ1431 | N.S VIDEO DRIVE IC LM2439 |
| U204 | 79PQ1435 | OSD IC MTV021N20 FOR CN95 |
| U301 | 79PQ0052 | IC LM1290 |
| U3A1 | 79PQ1438 | IC 74HC74 |
| U401 | 79PQ0036 | IC TDA4866 10P |
| U402 | 79PQ0037 | IC LM1295 |
| U701 | 79PQ1434 | MTP MCU WT62P1 FOR CN954 |
| U702 | 79PQ0048 | IC AT24C04(ATMEL) |

*** TRANSISTORS ***

| | | |
|------|----------|---------------------------|
| Q101 | 79PQ1248 | FET N 2SK2545 TO-220F |
| Q102 | 79PQ0064 | FET N YTAF630 TO-220F |
| Q103 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q104 | 79PQ1246 | TR PNP KSB772 TO-126 |
| Q105 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q106 | 79PQ1245 | TR NPN KSC 2328A TO-92(T) |
| Q107 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q108 | 79PQ1247 | TR PNP KSA 928A TO-92(T) |
| Q109 | 79PQ1244 | TR NPN KSP44 TO 92(T) |
| Q110 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q111 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q113 | 79PQ0057 | TR NPN 2SC1213AC TO-92(T) |
| Q115 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q117 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q201 | 79PQ0057 | TR NPN 2SC1213AC TO-92(T) |
| Q211 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q212 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q231 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q232 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q251 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q252 | 79PQ0811 | TR NPN BF422 TO-92(T) |
| Q301 | 79PQ0059 | TR NPN PH2369 TO-92(T) |
| Q302 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q303 | 79PQ0812 | TRNPN 2SC4002 TO-92(T) |
| Q304 | 79PQ0811 | TR NPN BF422 TO-92(T) |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| Q305 | 79PQ0061 | TR PNP BF423 TO-92(T) |
| Q306 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q307 | 79PQ1364 | TOSHIBA 2SC5411(HFE) |
| Q308 | 79PQ1249 | TR 2SK2961 FET |
| Q310 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q313 | 79PQ0064 | FET N YTAF630 TO-220F |
| Q314 | 79PQ0060 | TR PNP 2SB861C TO-220 |
| Q315 | 79PQ0061 | TR PNP BF423 TO-92(T) |
| Q316 | 79PQ0055 | TR NPN 2SD667AC TO-92(T) |
| Q317 | 79PQ1247 | TR PNP KSA 928A TO-92(T) |
| Q318 | 79PQ1245 | TR NPN KSC 2328A TO-92(T) |
| Q320 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q322 | 79PQ0064 | FET N YTAF630 TO-220F |
| Q323 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q324 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A1 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A2 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A3 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q3A4 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q401 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q402 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q601 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q603 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q604 | 79PQ0062 | TR PNP 2SA733P TO-92(T) |
| Q605 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q606 | 79PQ0056 | TR NPN 2SC945 TO-92(T) |
| Q70A | 79PQ0062 | TR PNP 2SA733P TO-92(T) |

*** DIODES ***

| | | |
|------|----------|---------------------------|
| D101 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D102 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D103 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D104 | 79PQ0318 | DIODE/A 3A 1N5406 (FAGOR) |
| D105 | 79PQ0066 | DIODE/T 1A BA159 |
| D106 | 79PQ0067 | DIODE/T 1A 1N4002 |
| D107 | 79PQ0065 | DIODE T" 1N4148" |
| D108 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D109 | 79PQ0065 | DIODE T" 1N4148" |
| D110 | 79PQ1238 | DIODE 600V/1.6A RG2A |
| D111 | 79PQ0721 | DIODE/A 3A RG4A (SANKEN) |
| D112 | 79PQ0794 | DIODE/A 2A/600V RG4A |
| D113 | 79PQ0798 | DIODE 3A/200V RG4Z |
| D114 | 79PQ0721 | DIODE/A 3A RG4A (SANKEN) |
| D115 | 79PQ0065 | DIODE T" 1N4148" |
| D117 | 79PQ0065 | DIODE T" 1N4148" |
| D120 | 79PQ0065 | DIODE T" 1N4148" |
| D126 | 79PQ0065 | DIODE T" 1N4148" |
| D127 | 79PQ0065 | DIODE T" 1N4148" |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| D128 | 79PQ0065 | DIODE T" 1N4148" |
| D129 | 79PQ0065 | DIODE T" 1N4148" |
| D130 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D133 | 79PQ0065 | DIODE T" 1N4148" |
| D134 | 79PQ0065 | DIODE T" 1N4148" |
| D136 | 79PQ0065 | DIODE T" 1N4148" |
| D201 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D202 | 79PQ0065 | DIODE T" 1N4148" |
| D203 | 79PQ0065 | DIODE T" 1N4148" |
| D204 | 79PQ0065 | DIODE T" 1N4148" |
| D205 | 79PQ0065 | DIODE T" 1N4148" |
| D210 | 79PQ0065 | DIODE T" 1N4148" |
| D211 | 79PQ0065 | DIODE T" 1N4148" |
| D213 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D214 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D230 | 79PQ0065 | DIODE T" 1N4148" |
| D231 | 79PQ0065 | DIODE T" 1N4148" |
| D233 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D234 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D250 | 79PQ0065 | DIODE T" 1N4148" |
| D251 | 79PQ0065 | DIODE T" 1N4148" |
| D253 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D254 | 79PQ0043 | DIODE/T 1/2W 1SS83 |
| D301 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D302 | 79PQ0065 | DIODE T" 1N4148" |
| D303 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D304 | 79PQ0065 | DIODE T" 1N4148" |
| D305 | 79PQ1250 | DIODE STKY/T 1A/60V SB160 |
| D306 | 79PQ0065 | DIODE T" 1N4148" |
| D307 | 79PQ0070 | DIODE/A 5TUZ47 |
| D308 | 79PQ0721 | DIODE/A 3A RG4A (SANKEN) |
| D309 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D30A | 79PQ0065 | DIODE T" 1N4148" |
| D310 | 79PQ0065 | DIODE T" 1N4148" |
| D311 | 79PQ0065 | DIODE T" 1N4148" |
| D312 | 79PQ1251 | DIODE/T 1A 1N4937 |
| D313 | 79PQ0065 | DIODE T" 1N4148" |
| D314 | 79PQ0065 | DIODE T" 1N4148" |
| D315 | 79PQ0065 | DIODE T" 1N4148" |
| D318 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D319 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D321 | 79PQ1251 | DIODE/T 1A 1N4937 |
| D322 | 79PQ1251 | DIODE/T 1A 1N4937 |
| D323 | 79PQ0065 | DIODE T" 1N4148" |
| D324 | 79PQ0068 | DIODE/T 1A 1N4936 |
| D325 | 79PQ0065 | DIODE T" 1N4148" |
| D34A | 79PQ0065 | DIODE T" 1N4148" |
| D3A1 | 79PQ0065 | DIODE T" 1N4148" |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| D3A2 | 79PQ0065 | DIODE T" 1N4148" |
| D4A1 | 79PQ0065 | DIODE T" 1N4148" |
| D4A2 | 79PQ0065 | DIODE T" 1N4148" |
| D601 | 79PQ0065 | DIODE T" 1N4148" |
| D602 | 79PQ0065 | DIODE T" 1N4148" |
| D604 | 79PQ0065 | DIODE T" 1N4148" |
| D605 | 79PQ0065 | DIODE T" 1N4148" |
| D701 | 79PQ0065 | DIODE T" 1N4148" |
| D704 | 79PQ0065 | DIODE T" 1N4148" |
| ZD101 | 79PQ0078 | ZEN DIODE 1/2W(T) 18V |
| ZD102 | 79PQ0077 | ZEN DIODE 1/2W(T) 12A2 |
| ZD103 | 79PQ0078 | ZEN DIODE 1/2W(T) 18V |
| ZD104 | 79PQ1441 | ZEN DIODE 1/2W(T) HZS6B2 |
| ZD105 | 79PQ1252 | ZEN DIODE 1/2W(T) HZS20.2 |
| ZD301 | 79PQ0077 | ZEN DIODE 1/2W(T) 12A2 |
| ZD303 | 79PQ0075 | ZEN DIODE 1/2W(T) 5C2 |
| ZD701 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD702 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD703 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD704 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |
| ZD706 | 79PQ0292 | ZEN DIODE 1/2W(T) 6C2 |

*** TRANSFORMERS ***

| | | |
|------|----------|---------------------------|
| T101 | 79PQ1440 | POWER X'FM ERL35 500UH(3. |
| T301 | 79PQ1361 | 17FBT DOUBLE FOCUS" |
| T302 | 79PQ0030 | H.DRIVE X'FM 4.5MH EI-19 |
| T303 | 79PQ1240 | TRANS, H.DF X'FM EI-19 |

*** VARIABLE RESISTORS ***

| | | |
|-------|----------|---------------------------|
| VR101 | 79PQ0195 | VR CARBON 6MM10K VZ067TL1 |
| VR102 | 79PQ0194 | VR CARBON 6MM 1K |
| VR302 | 79PQ0195 | VR CARBON 6MM10K VZ067TL1 |
| VR307 | 79PQ1076 | VR CARBON 6MM 200K BM |

*** RELAYS & SWITCHES ***

| | | |
|-------|----------|------------------------|
| SW101 | 79PQ0974 | POWER SW ESB92S21B TV5 |
| SW701 | 79PQ1437 | TACT SW SKHHQV |
| SW702 | 79PQ1437 | TACT SW SKHHQV |
| SW703 | 79PQ1437 | TACT SW SKHHQV |
| SW704 | 79PQ1437 | TACT SW SKHHQV |
| SW705 | 79PQ1437 | TACT SW SKHHQV |
| SW706 | 79PQ1437 | TACT SW SKHHQV |
| SW707 | 79PQ1437 | TACT SW SKHHQV |

*** PWB ASSYS ***

| | | |
|--|----------|---------------|
| | 849E9B01 | SUB PWB ASSY |
| | 849E9F01 | MAIN PWB ASSY |
| | 849E9J01 | CRT PWB ASSY |

| SYMBOL | PART NO | DESCRIPTION |
|--------|---------|-------------|
|--------|---------|-------------|

*** COILS & FILTERS ***

| | | |
|-------|----------|---------------------------|
| B101 | 79PQ1104 | BEAD 3.5X4.7/T |
| B102 | 79PQ1233 | BEAD WBR6H-3T-R7K-B5 |
| B104 | 79PQ1104 | BEAD 3.5X4.7/T |
| B105 | 79PQ1104 | BEAD 3.5X4.7/T |
| B106 | 79PQ1104 | BEAD 3.5X4.7/T |
| B107 | 79PQ1104 | BEAD 3.5X4.7/T |
| B201 | 79PQ1232 | BEAD 3.5*6*0.8/T |
| B208 | 79PQ1232 | BEAD 3.5*6*0.8/T |
| B301 | 79PQ1104 | BEAD 3.5X4.7/T |
| B302 | 79PQ1104 | BEAD 3.5X4.7/T |
| G2WIR | 79PQ0275 | FILTER COIL 20.45X10.2X10 |
| G4WIR | 79PQ0275 | FILTER COIL 20.45X10.2X10 |
| L101 | 79PQ0019 | LINE FILTER ET24 10MH MIN |
| L102 | 79PQ0277 | LINE FILTER UU10.5 1MH |
| L106 | 79PQ1169 | CHOKE COIL 1.3MH |
| L201 | 79PQ0276 | CHOKE COIL 100UH 8X10 |
| L202 | 79PQ0276 | CHOKE COIL 100UH 8X10 |
| L203 | 79PQ1460 | PACKING COIL/T 1.2UH K |
| L204 | 79PQ1460 | PACKING COIL/T 1.2UH K |
| L205 | 79PQ1460 | PACKING COIL/T 1.2UH K |
| L206 | 79PQ1104 | BEAD 3.5X4.7/T |
| L207 | 79PQ1277 | PACKING COIL T 10UH K |
| L303 | 79PQ0806 | CHOKE COIL 130UH 18X20 |
| L305 | 79PQ1235 | H. CENTER CHOKE 5MH 8*20 |
| L306 | 79PQ1366 | LINEARITY COIL 4UH |
| L307 | 79PQ1367 | LINEARITY COIL 3.2UH |
| R157 | 79PQ1104 | BEAD 3.5X4.7/T |
| RL101 | 79PQ1239 | RELAY 12V 6P GSA-SS-212DM |

*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***

| | | |
|--------|----------|---------------------------|
| CRTS | 79PQ1363 | ISDW02S41 CRT SOCKET |
| F101 | 79PQ0799 | FUSE 3.15A/250V 50T |
| LED101 | 79PQ1436 | LED SMLS79723C |
| LED102 | 79PQ1436 | LED SMLS79723C |
| LED103 | 79PQ1436 | LED SMLS79723C |
| P101 | 79PQ0290 | AC SOCKET 3P |
| RL321 | 79PQ0288 | RELAY 12V |
| SG301 | 79PQ1164 | SPAKER GAP 1.5KV |
| TH101 | 79PQ0311 | THERMISTOR NTCR SCK054 |
| TH102 | 79PQ1439 | THERMISTER PTCR PTH451A4R |
| X701 | 79PQ0079 | X'TAL 49U 4MHZ |
| DEG | 6A131701 | DEGAUSSING COIL(110T,15.4 |
| CORD | 70800090 | POWER CORD E2 L1.9 |
| CABLE | 73893289 | SIGNAL CABLE XH6,7P J-H |

| SYMBOL | PART NO | DESCRIPTION |
|-------------------------------------|----------|-------------------------|
| *** APPEARANCE PARTS *** | | |
| A4001 | 25431122 | CONTROL PANEL |
| A3001 | 2E324441 | CABINET BACK |
| A3002 | 2E324401 | CABINET FRONT ASSY |
| A4005 | 2E430783 | REVOLVING STAND ASSY |
| A4502 | 2E457941 | PUSH BUTTON(CONTROL) |
| A4501 | 2X456851 | PUSH BUTTON(SW)(B) |
| A5001 | 2E548742 | CHASSIS BASE |
| *** PRINTED & PACKING MATERIALS *** | | |
| A8004 | 2E835071 | SHEET,PROTECTION |
| A8001 | 2E837222 | FILLER(T),CARTON |
| A8002 | 2E837232 | FILLER(B),CARTON |
| MANUAL | 78135531 | USER'S MANUAL CN954B |
| | 7A861121 | SALES OFFICE LIST(USA) |
| *** RESISTORS *** | | |
| C113 | 79PQ1005 | ELECT 105'C/T 10U/50V |
| R101 | 79PQ0156 | CARBON 1/2W(T) 5% 680K |
| R102 | 79PQ0324 | CARBON 1/4W(T) 5% 100H |
| R103 | 79PQ1261 | MOF 1W/M(B) 5% 15H |
| R104 | 79PQ1448 | MOF 1W/M(A) 5% 1.8H |
| R106 | 79PQ0350 | WOUND RES 5W(B) 5% 22K |
| R107 | 79PQ0328 | CARBON 1/4W(T) 5% 560K |
| R108 | 79PQ0327 | CARBON 1/4W(T) 5% 300K |
| R109 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R110 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R111 | 79PQ0847 | WOUND RES 2W(A)5% 0.15H |
| R112 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R113 | 79PQ0122 | CARBON 1/8W(T) 5% 7.5K |
| R114 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R115 | 79PQ0108 | CARBON 1/8W(T) 5% 39H |
| R116 | 79PQ0132 | CARBON 1/4W(T) 5% 270H |
| R117 | 79PQ0108 | CARBON 1/8W(T) 5% 39H |
| R118 | 79PQ0128 | CARBON 1/4W(T) 5% 20K |
| R119 | 79PQ0116 | CARBON 1/8W(T) 5% 470K |
| R120 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R121 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R122 | 79PQ0091 | CARBON 1/8W(T) 5% 150K |
| R123 | 79PQ0139 | CARBON 1/4W 5% 560H |
| R126 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R127 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R128 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R129 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R130 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R131 | 79PQ1379 | MOF 2W/M(B)5% 5.6H |
| R132 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R133 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|--------------------------|
| R134 | 79PQ0340 | MOF 1W/M(A) 5% 10H |
| R135 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R136 | 79PQ0348 | WOUND RES 1W(B) 5% 0.5H |
| R137 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R138 | 79PQ0141 | CARBON 1/4W(T) 5% 75H |
| R139 | 79PQ0155 | CARBON 1/2W(T) 5% 560H |
| R140 | 79PQ0322 | CARBON 1/8W(T) 5% 47H |
| R141 | 79PQ0094 | CARBON 1/8W(T) 5% 20K |
| R142 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R143 | 79PQ0173 | MOF 1W/M(A) 5% 62K |
| R144 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R145 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R146 | 79PQ0095 | CARBON 1/8W(T) 5% 2.2K |
| R147 | 79PQ0093 | CARBON 1/8W(T) 5% 2K |
| R148 | 79PQ1259 | MOF 1W/M(A) 5% 10KH |
| R149 | 79PQ0325 | CARBON 1/4W(T) 5% 150K |
| R151 | 79PQ1262 | MOF 1W/M(B) 5% 470H |
| R152 | 79PQ0321 | CARBON 1/8W(T) 5% 3.3K |
| R153 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R154 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R155 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R156 | 79PQ0726 | RES FUSEABLE 1/2W 1.5H J |
| R158 | 79PQ0732 | RES FUSEABLE 1/4W 47H J |
| R159 | 79PQ0137 | CARBON 1/4W(T) 5% 4.7K |
| R160 | 79PQ0093 | CARBON 1/8W(T) 5% 2K |
| R161 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R163 | 79PQ0125 | CARBON 1/4W 5% 1K |
| R164 | 79PQ1259 | MOF 1W/M(A) 5% 10KH |
| R165 | 79PQ0325 | CARBON 1/4W(T) 5% 150K |
| R169 | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R170 | 79PQ0085 | CARBON 1/8W(T) 5% 1M |
| R177 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R178 | 79PQ0111 | CARBON 1/8W(T) 5% 39K |
| R182 | 79PQ0146 | CARBON 1/2W(T) 5% 1K |
| R190 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R191 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R192 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R1A1 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R1A2 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R1A3 | 79PQ0080 | CARBON 1/8W(T) 5% 10H |
| R201 | 79PQ1443 | CARBON 1/8W(T) 5% 56H |
| R202 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R203 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R204 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R205 | 79PQ0737 | CARBON 1/8W(T) 5% 1.8K |
| R206 | 79PQ0126 | CARBON 1/4W(T) 5% 10K |
| R208 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R209 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|--------------------------|
| R210 | 79PQ0168 | METAL 1/4W(T) 1% 75H |
| R211 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R212 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R213 | 79PQ0109 | CARBON 1/8W(T) 5% 390H |
| R219 | 79PQ0825 | CARBON 1/2W(T) 5% 10K |
| R220 | 79PQ1177 | CARBON 1/4W(T) 5% 150H |
| R221 | 79PQ1253 | R,CARBON 1/8W(T) 5% 110H |
| R223 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R224 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R225 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R226 | 79PQ0121 | CARBON 1/8W(T) 5% 6.8K |
| R228 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R229 | 79PQ1027 | CARBON 1/8W(T) 5% 91K |
| R230 | 79PQ0168 | METAL 1/4W(T) 1% 75H |
| R231 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R232 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R233 | 79PQ0109 | CARBON 1/8W(T) 5% 390H |
| R239 | 79PQ0825 | CARBON 1/2W(T) 5% 10K |
| R240 | 79PQ1177 | CARBON 1/4W(T) 5% 150H |
| R241 | 79PQ1253 | R,CARBON 1/8W(T) 5% 110H |
| R243 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R244 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R245 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R246 | 79PQ0121 | CARBON 1/8W(T) 5% 6.8K |
| R248 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R249 | 79PQ1027 | CARBON 1/8W(T) 5% 91K |
| R250 | 79PQ0168 | METAL 1/4W(T) 1% 75H |
| R251 | 79PQ0105 | CARBON 1/8W(T) 5% 33H |
| R252 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R253 | 79PQ0109 | CARBON 1/8W(T) 5% 390H |
| R259 | 79PQ0825 | CARBON 1/2W(T) 5% 10K |
| R260 | 79PQ1177 | CARBON 1/4W(T) 5% 150H |
| R261 | 79PQ1253 | R,CARBON 1/8W(T) 5% 110H |
| R263 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R264 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R265 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R266 | 79PQ0121 | CARBON 1/8W(T) 5% 6.8K |
| R268 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R269 | 79PQ1027 | CARBON 1/8W(T) 5% 91K |
| R270 | 79PQ1255 | R,CARBON 1/8W(T) 5% 220H |
| R277 | 79PQ1026 | CARBON 1/8W(T) 5% 82KH |
| R278 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R280 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R282 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R284 | 79PQ0120 | CARBON 1/8W(T) 5% 680H |
| R286 | 79PQ1034 | CARBON 1/4W(T) 5% 330K |
| R287 | 79PQ0145 | CARBON 1/2W(T) 5% 100H |
| R288 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| R289 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R291 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R292 | 79PQ0324 | CARBON 1/4W(T) 5% 100H |
| R293 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R294 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R295 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R296 | 79PQ0085 | CARBON 1/8W(T) 5% 1M |
| R297 | 79PQ0347 | FUSIBLE MF RES 1/4W 2.2H |
| R2A1 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A2 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A3 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A4 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R2A5 | 79PQ0738 | CARBON 1/8W(T) 5% 36K |
| R2A6 | 79PQ0738 | CARBON 1/8W(T) 5% 36K |
| R2A7 | 79PQ0738 | CARBON 1/8W(T) 5% 36K |
| R2A8 | 79PQ1016 | CARBON 1/8W(T) 5% 18K |
| R2A9 | 79PQ1016 | CARBON 1/8W(T) 5% 18K |
| R2AA | 79PQ1016 | CARBON 1/8W(T) 5% 18K |
| R2AE | 79PQ1442 | CARBON 1/8W(T) 5% 16K |
| R2AF | 79PQ1442 | CARBON 1/8W(T) 5% 16KOHM |
| R2AH | 79PQ1442 | CARBON 1/8W(T) 5% 16KOHM |
| R300 | 79PQ0399 | CARBON 1/8W(T) 5% 1.3K |
| R301 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R302 | 79PQ1368 | RESISTOR FUSEBLE 1/2W0.47 |
| R303 | 79PQ0119 | CARBON 1/8W(T) 5% 560H |
| R304 | 79PQ0342 | MOF 3W/M(A) 5% 3.3H |
| R305 | 79PQ0085 | CARBON 1/8W(T) 5% 1M |
| R306 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R307 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R308 | 79PQ1444 | CARBON 1/2W(T) 5% 360H |
| R309 | 79PQ0185 | MOF 3W/M(A) 5% 5.6H |
| R30A | 79PQ0321 | CARBON 1/8W(T) 5% 3.3K |
| R30C | 79PQ1051 | METAL 1/4W(T) 1% 22K |
| R310 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R311 | 79PQ0843 | MOF 2W/M(A) 5% 0.82H |
| R312 | 79PQ0170 | MOF 1W/M(A) 5% 27H |
| R313 | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R314 | 79PQ0731 | RES FUSEABLE 1/2W 1.0H J |
| R315 | 79PQ0827 | CARBON 1/2W (T) 5% 1M |
| R316 | 79PQ1180 | MOF 1W/M(A) 5% 1KH |
| R318 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R319 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R321 | 79PQ0153 | CARBON 1/2W(T) 5% 4.7H |
| R322 | 79PQ0086 | CARBON 1/8W(T) 5% 1.2K |
| R323 | 79PQ0340 | MOF 1W/M(A) 5% 10H |
| R324 | 79PQ0340 | MOF 1W/M(A) 5% 10H |
| R325 | 79PQ0111 | CARBON 1/8W(T) 5% 39K |
| R326 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|------------------------|
| R327 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R328 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R329 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R32A | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R330 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R331 | 79PQ0101 | CARBON 1/8W(T) 5% 27K |
| R332 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R333 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R334 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R335 | 79PQ1263 | MOF 2W/M(A) 5% 100H |
| R336 | 79PQ1058 | METAL 1/4W(T) 1% 5.6K |
| R337 | 79PQ0106 | CARBON 1/8W(T) 5% 33K |
| R338 | 79PQ0131 | CARBON 1/4W(T) 5% 24K |
| R339 | 79PQ1371 | CARBON 1/8W(T) 5% 68K |
| R340 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R341 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R342 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R343 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R344 | 79PQ0146 | CARBON 1/2W(T) 5% 1K |
| R345 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R346 | 79PQ1445 | METAL 1/4W(T) 1% 1K |
| R347 | 79PQ0837 | METAL 1/4W(T) 1% 6.8K |
| R348 | 79PQ1041 | CARBON 1/2W(T) 5% 470K |
| R349 | 79PQ1449 | MOF 1W/M(A) 5% 33K |
| R34A | 79PQ1059 | METAL 1/4W(T) 1% 56K |
| R351 | 79PQ0345 | METAL 1/4W(T) 5% 1H |
| R352 | 79PQ0330 | METAL 1/4W(T) 1% 11.3K |
| R353 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R354 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R355 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R356 | 79PQ0827 | CARBON 1/2W (T) 5% 1M |
| R357 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R358 | 79PQ0091 | CARBON 1/8W(T) 5% 150K |
| R359 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R360 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R361 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R362 | 79PQ0088 | CARBON 1/8W(T) 5% 120K |
| R363 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |
| R364 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R366 | 79PQ1446 | METAL 1/4W(T) 1% 120K |
| R368 | 79PQ0334 | METAL 1/4W(T) 1% 18K |
| R369 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R370 | 79PQ0130 | CARBON 1/4W(T) 5% 220K |
| R371 | 79PQ0739 | CARBON 1/8W(T) 5% 5.6K |
| R372 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R373 | 79PQ0337 | METAL 1/4W(T) 1% 3.48K |
| R374 | 79PQ0161 | METAL 1/4W(T) 1% 10K |
| R375 | 79PQ0084 | CARBON 1/8W(T) 5% 100K |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|-------------------------|
| R376 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R377 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R378 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R379 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R380 | 79PQ0130 | CARBON 1/4W(T) 5% 220K |
| R381 | 79PQ0130 | CARBON 1/4W(T) 5% 220K |
| R382 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R383 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R384 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R386 | 79PQ0161 | METAL 1/4W(T) 1% 10K |
| R388 | 79PQ1447 | METAL 1/4W(T) 1% 604H |
| R389 | 79PQ0833 | METAL 1/4W(T) 1% 13.7K |
| R390 | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R391 | 79PQ1450 | MOF 3W/M(A) 5% 27H |
| R392 | 79PQ1375 | METAL 1/4W(T) 1% 150K |
| R393 | 79PQ0826 | CARBON 1/2W(T) 5% 100K |
| R394 | 79PQ0116 | CARBON 1/8W(T) 5% 470K |
| R395 | 79PQ0830 | CARBON 1/2W(T) 5% 56K |
| R3A2 | 79PQ0820 | CARBON 1/8W(T) 5% 56K |
| R3A3 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R3A4 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A5 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A6 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A7 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3A8 | 79PQ0110 | CARBON 1/8W(T) 5% 3.9K |
| R3A9 | 79PQ0110 | CARBON 1/8W(T) 5% 3.9K |
| R3AA | 79PQ0086 | CARBON 1/8W(T) 5% 1.2K |
| R3AE | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R3AF | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3AG | 79PQ0089 | CARBON 1/8W(T) 5% 1.5K |
| R3AH | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R3AJ | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R3AK | 79PQ0090 | CARBON 1/8W(T) 5% 15K |
| R401 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R402 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R403 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R408 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R410 | 79PQ0089 | CARBON 1/8W(T) 5% 1.5K |
| R411 | 79PQ0089 | CARBON 1/8W(T) 5% 1.5K |
| R412 | 79PQ0147 | CARBON 1/2W (T) 5% 1H |
| R413 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R414 | 79PQ0129 | CARBON 1/4W(T) 5% 2.2K |
| R415 | 79PQ0743 | RES MOF 1W/M(A) 5% 330H |
| R416 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R418 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R419 | 79PQ0112 | CARBON 1/8W(T) 5% 390K |
| R420 | 79PQ0091 | CARBON 1/8W(T) 5% 150K |
| R421 | 79PQ0124 | CARBON 1/4W(T) 5% 10H |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|--------------------------|
| R422 | 79PQ1256 | R,CARBON 1/2W(T) 5% 220H |
| R430 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R432 | 79PQ0125 | CARBON 1/4W 5% 1K |
| R433 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R434 | 79PQ0097 | CARBON 1/8W(T) 5% 220K |
| R440 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R442 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R443 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R444 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R447 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R449 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R450 | 79PQ0820 | CARBON 1/8W(T) 5% 56K |
| R451 | 79PQ0126 | CARBON 1/4W(T) 5% 10K |
| R452 | 79PQ0110 | CARBON 1/8W(T) 5% 3.9K |
| R454 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R455 | 79PQ0104 | CARBON 1/8W(T) 5% 300K |
| R456 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R457 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R460 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R462 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R463 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R477 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R4A1 | 79PQ0323 | CARBON 1/8W(T) 5% 9.1K |
| R601 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R602 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R603 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R604 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R605 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R606 | 79PQ0341 | MOF 1W/M(B) 5% 10H |
| R608 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R609 | 79PQ0095 | CARBON 1/8W(T) 5% 2.2K |
| R610 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R611 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R612 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R613 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R701 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R704 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R706 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R707 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R70A | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R710 | 79PQ0082 | CARBON 1/8W(T) 5% 1K |
| R712 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R713 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R715 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R717 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R718 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R720 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R725 | 79PQ1016 | CARBON 1/8W(T) 5% 18KH |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|------------------------|
| R726 | 79PQ1016 | CARBON 1/8W(T) 5% 18KH |
| R728 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R729 | 79PQ0115 | CARBON 1/8W(T) 5% 47K |
| R733 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R739 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R740 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R742 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R743 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R751 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R752 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R753 | 79PQ0096 | CARBON 1/8W(T) 5% 22K |
| R755 | 79PQ0123 | CARBON 1/8W(T) 5% 8.2K |
| R756 | 79PQ0083 | CARBON 1/8W(T) 5% 10K |
| R761 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R762 | 79PQ0081 | CARBON 1/8W(T) 5% 100H |
| R768 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R769 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R770 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |
| R771 | 79PQ0113 | CARBON 1/8W(T) 5% 470H |
| R772 | 79PQ0737 | CARBON 1/8W(T) 5% 1.8K |
| R773 | 79PQ0114 | CARBON 1/8W(T) 5% 4.7K |

*** CAPACITORS ***

| | | |
|------|----------|---------------------------|
| C101 | 79PQ0272 | SAFETY X-CAP 0.47U/275V M |
| C102 | 79PQ0273 | SAFE Y-CAP/D 2200P/400V M |
| C103 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C104 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C105 | 79PQ0382 | POWER ELECT 85C 330U/400V |
| C106 | 79PQ1457 | PLASTIC MPE/A 0.1U/250V J |
| C109 | 79PQ0200 | ELECT 85'C/T 100U/25V M |
| C10A | 79PQ1433 | CERAMIC Y5P(B)/T 220P/1KV |
| C110 | 79PQ0238 | CC Y5P(B)/T 470P/50V K |
| C111 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C112 | 79PQ0211 | ELECT 85'C/T 47U/25V M |
| C114 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C115 | 79PQ0256 | MEF CAP BOX 0.0033U/63VJ |
| C116 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C117 | 79PQ0199 | ELECT 85'C/T 100U/16V M |
| C119 | 79PQ0221 | ELECT 105'C/A 100U/100V M |
| C120 | 79PQ0225 | ELECT 105'C/A 220U/100V M |
| C121 | 79PQ1452 | ELECT 85C/A 1000U/35V M |
| C122 | 79PQ1453 | ELECT 105C/A 470U/16V M |
| C123 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C124 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C125 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C126 | 79PQ0237 | CC Y5P(B)/T 330P/1KV K |
| C129 | 79PQ1432 | ELECT 105C 47U/250V M LOW |
| C130 | 79PQ0210 | ELECT 85'C/T 47U/16V M |

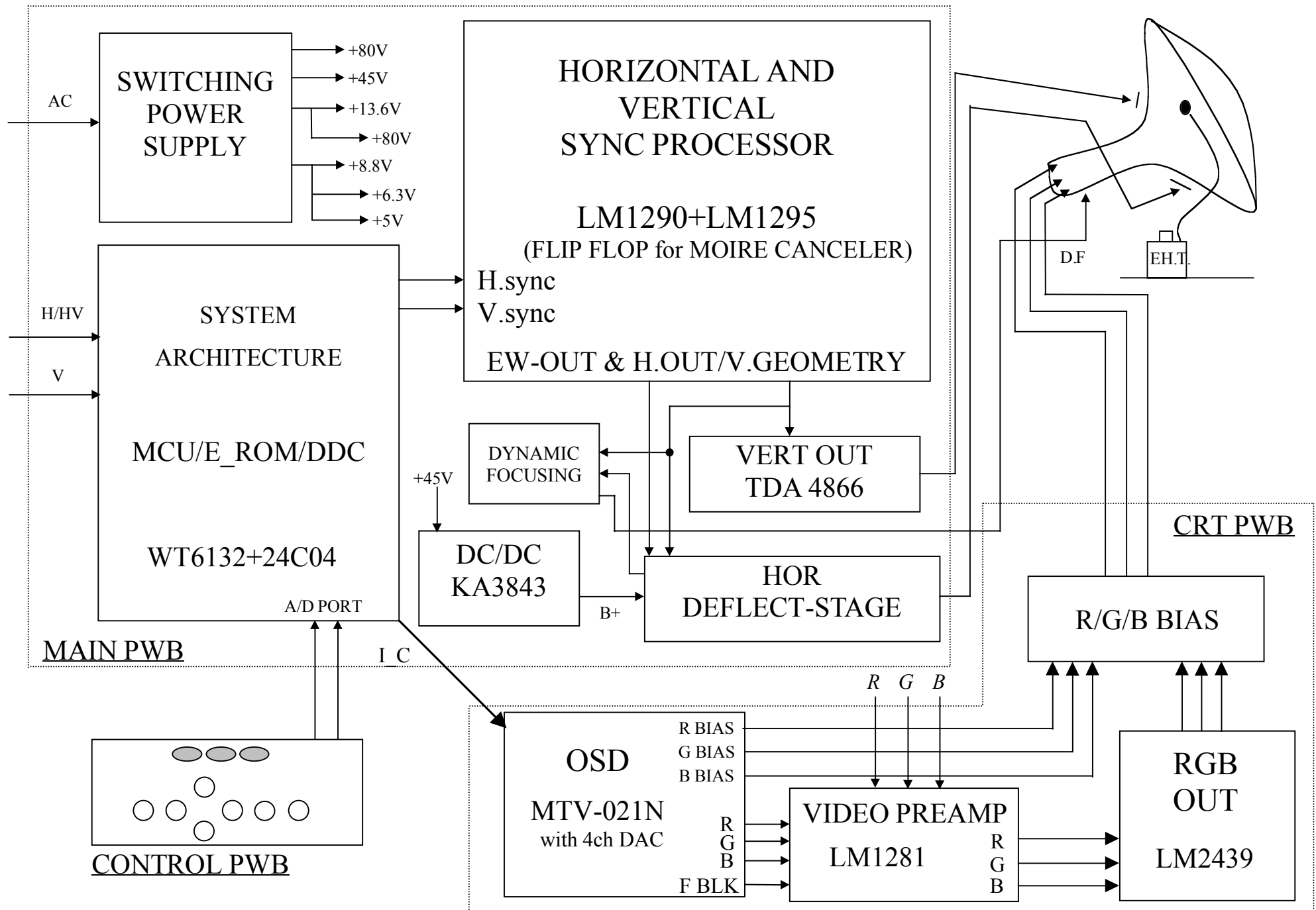
| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C131 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C132 | 79PQ0758 | MEF CAP BOX 0.033U/50V J |
| C133 | 79PQ0256 | MEF CAP BOX 0.0033U/63VJ |
| C134 | 79PQ0238 | CC Y5P(B)/T 470P/50V K |
| C136 | 79PQ0218 | ELECT 85'C/A 1000U/16V M |
| C137 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C138 | 79PQ0225 | ELECT 105'C/A 220U/100V M |
| C140 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C142 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C143 | 79PQ0264 | PLASTIC MPE/A 0.033U/250V |
| C145 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C146 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C149 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C150 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C151 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C152 | 79PQ1455 | CERAMIC Y5P(B)/T 680P/2KV |
| C154 | 79PQ0274 | SAFE Y-CAP/S 1000P/400V M |
| C156 | 79PQ0305 | ELECT 105C/T 4.7U/50V M |
| C161 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C162 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C164 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C201 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C202 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C203 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C204 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C205 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C206 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C207 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C209 | 79PQ0204 | ELECT 85'C/T 220U/16V M |
| C20A | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C210 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C213 | 79PQ0213 | ELECT NP/T 1U/100V M |
| C214 | 79PQ1265 | C,ELEC 1UF 100V M |
| C230 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C231 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C233 | 79PQ0213 | ELECT NP/T 1U/100V M |
| C234 | 79PQ1265 | C,ELEC 1UF 100V M |
| C250 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C253 | 79PQ0213 | ELECT NP/T 1U/100V M |
| C254 | 79PQ1265 | C,ELEC 1UF 100V M |
| C267 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C270 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C271 | 79PQ1272 | C,PLASTIC 0.001UF 50V J |
| C272 | 79PQ0854 | CC Y5P(B)/T 470P/500V K |
| C275 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C276 | 79PQ0235 | CC Y5P(B)/T 1000P/1KV K |
| C277 | 79PQ1381 | CERAMIC Z5V(F)3300PF/1KV |
| C278 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |

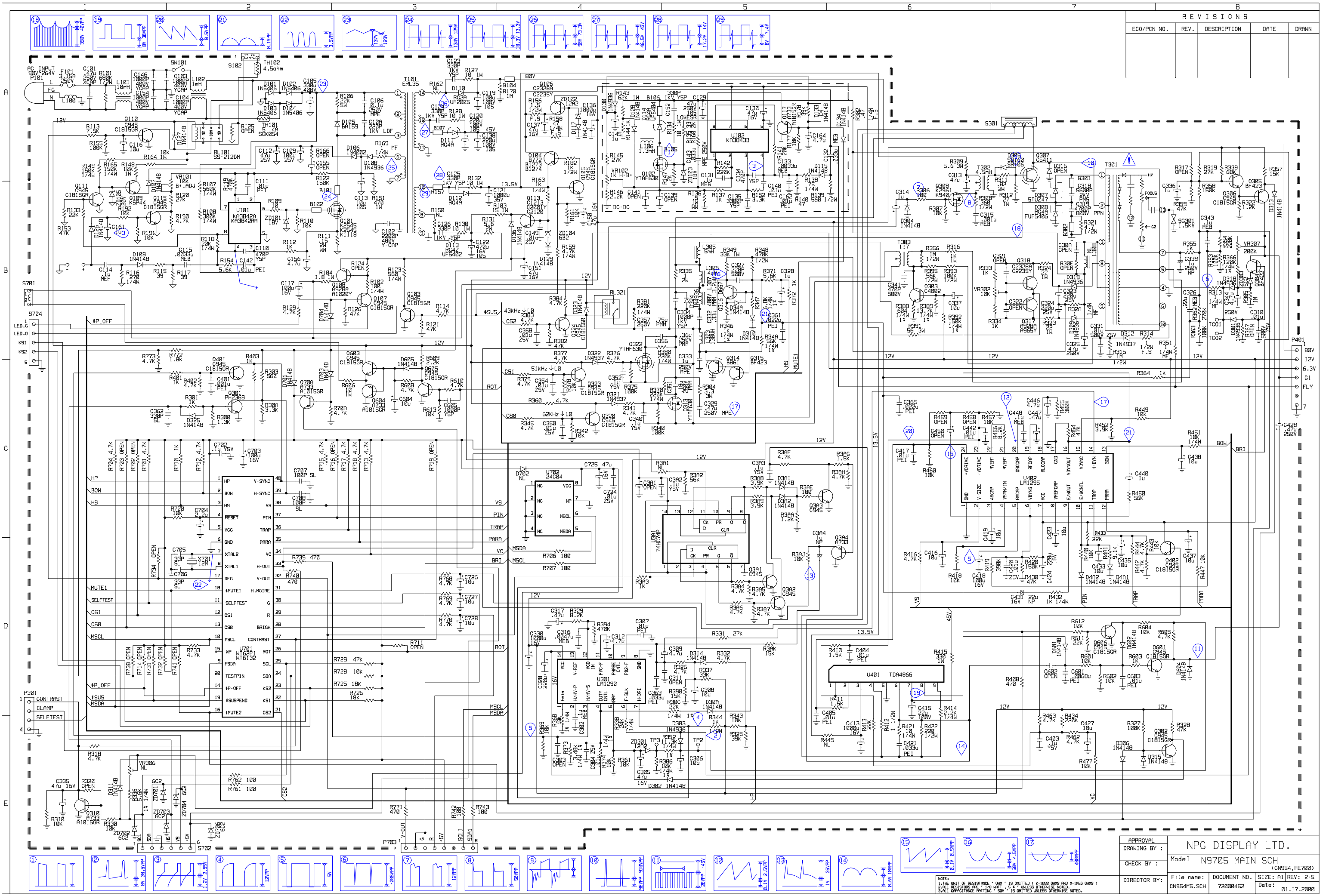
| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C280 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C281 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C282 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C283 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C284 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C285 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C287 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C288 | 79PQ0224 | ELECT 105'C/T 22U/100V M |
| C289 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C291 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C292 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C293 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C294 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C295 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C296 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C297 | 79PQ0234 | CC Y5P(B)/T 1000P/500V K |
| C299 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C2A1 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C2A2 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C2A3 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C2A4 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C302 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C304 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C305 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C306 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C307 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C308 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C309 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C310 | 79PQ1271 | C,CERAMIC 0.01UF 500V Z |
| C312 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |
| C313 | 79PQ1267 | C,ELEC 47UF 50V M |
| C314 | 79PQ0752 | MEF CAP BOX 0.1U/50V J |
| C315 | 79PQ0748 | MEF CAP BOX 0.001U/50V J |
| C316 | 79PQ0763 | MEF CAP BOX 0.0047U/63V J |
| C317 | 79PQ0207 | ELECT 85C/T 0.47U/50V M |
| C318 | 79PQ1383 | PLASTIC PMS/A5600P/2KV J |
| C319 | 79PQ1123 | PLASTIC PPN/A 4700P/800V |
| C320 | 79PQ0204 | ELECT 85'C/T 220U/16V M |
| C323 | 79PQ1266 | C,ELEC 220UF 25V M |
| C324 | 79PQ1266 | C,ELEC 220UF 25V M |
| C325 | 79PQ1269 | C,ELEC 47UF 250V M |
| C326 | 79PQ0255 | MEF CAP BOX 0.22U/63V J |
| C327 | 79PQ1454 | CERAMIC Y5P(B)/T 220P/500 |
| C328 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C329 | 79PQ1125 | PLASTIC MPE/A 0.47U/250V |
| C330 | 79PQ0218 | ELECT 85'C/A 1000U/16V M |
| C331 | 79PQ1271 | C,CERAMIC 0.01UF 500V Z |
| C332 | 79PQ1458 | PLASTIC PMM/A 0.33U/400V |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C333 | 79PQ0261 | PLASTIC MPE/A 1U/250V J |
| C334 | 79PQ0235 | CC Y5P(B)/T 1000P/1KV K |
| C335 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C336 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C337 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C339 | 79PQ0376 | ELECT NP/T 1U/250VM |
| C340 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C341 | 79PQ0854 | CC Y5P(B)/T 470P/500V K |
| C343 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C344 | 79PQ0746 | ELECT 85C/T 4.7U/250V M |
| C350 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C351 | 79PQ0862 | PLASTIC MPPS/A 0.18U/250V |
| C352 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C354 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C356 | 79PQ1101 | PLASTIC MPP/A 0.36U/250V |
| C357 | 79PQ1459 | PLASTIC PMM/A 0.75U/250V |
| C358 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C361 | 79PQ0246 | CQ PEI/T 0.022U/50V J |
| C362 | 79PQ0232 | CERAMIC SL/T 330P/50V J |
| C363 | 79PQ0916 | PLASTIC PEI/T 0.033U/50V |
| C365 | 79PQ0246 | CQ PEI/T 0.022U/50V J |
| C3A2 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C3A3 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C3A4 | 79PQ1451 | ELECT NP/T 1U/50V M |
| C401 | 79PQ1272 | C,PLASTIC 0.001UF 50V J |
| C403 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C404 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C405 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C413 | 79PQ0218 | ELECT 85'C/A 1000U/16V M |
| C415 | 79PQ1268 | C,ELEC 22UF 100V M |
| C416 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C417 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C418 | 79PQ0199 | ELECT 85'C/T 100U/16V M |
| C419 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C420 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C421 | 79PQ0916 | PLASTIC PEI/T 0.033U/50V |
| C423 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C424 | 79PQ0204 | ELECT 85'C/T 220U/16V M |
| C427 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C428 | 79PQ0850 | ELECT 85C/T 0.47U/250VM |
| C431 | 79PQ1084 | ELECT NP/T 100U/16V M |
| C433 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C435 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C437 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C438 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C440 | 79PQ0196 | ELECT 85'C/T 1U/50V M |
| C442 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C446 | 79PQ0208 | ELECT 85'C/T 4.7U/50V M |

| SYMBOL | PART NO | DESCRIPTION |
|--------|----------|---------------------------|
| C447 | 79PQ0207 | ELECT 85C/T 0.47U/50V M |
| C448 | 79PQ0253 | MEF CAP BOX 0.1U/63V J |
| C601 | 79PQ1456 | PLASTIC PEI/T 0.0068U/50V |
| C603 | 79PQ0245 | CQ PEI/T 0.01U/50V J |
| C604 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C605 | 79PQ0233 | CC Y5P(B)/T 1000P/50V K |
| C702 | 79PQ0228 | CERAMIC Y5V/T 0.1U/50V Z |
| C703 | 79PQ0199 | ELECT 85'C/T 100U/16V M |
| C704 | 79PQ0202 | ELECT 85'C/T 2.2U/50V M |
| C705 | 79PQ0231 | CERAMIC SL/T 33P/50V J |
| C706 | 79PQ0231 | CERAMIC SL/T 33P/50V J |
| C707 | 79PQ0229 | CERAMIC SL/T 100P/50V J |
| C708 | 79PQ0229 | CERAMIC SL/T 100P/50V J |
| C724 | 79PQ0242 | CC Z5V(F)/T 0.01U/50V Z |
| C725 | 79PQ0210 | ELECT 85'C/T 47U/16V M |
| C726 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C727 | 79PQ0198 | ELECT 85'C/T 10U/50V M |
| C728 | 79PQ0198 | ELECT 85'C/T 10U/50V M |

FE700 (N9705) BLOCK DIAGRAM

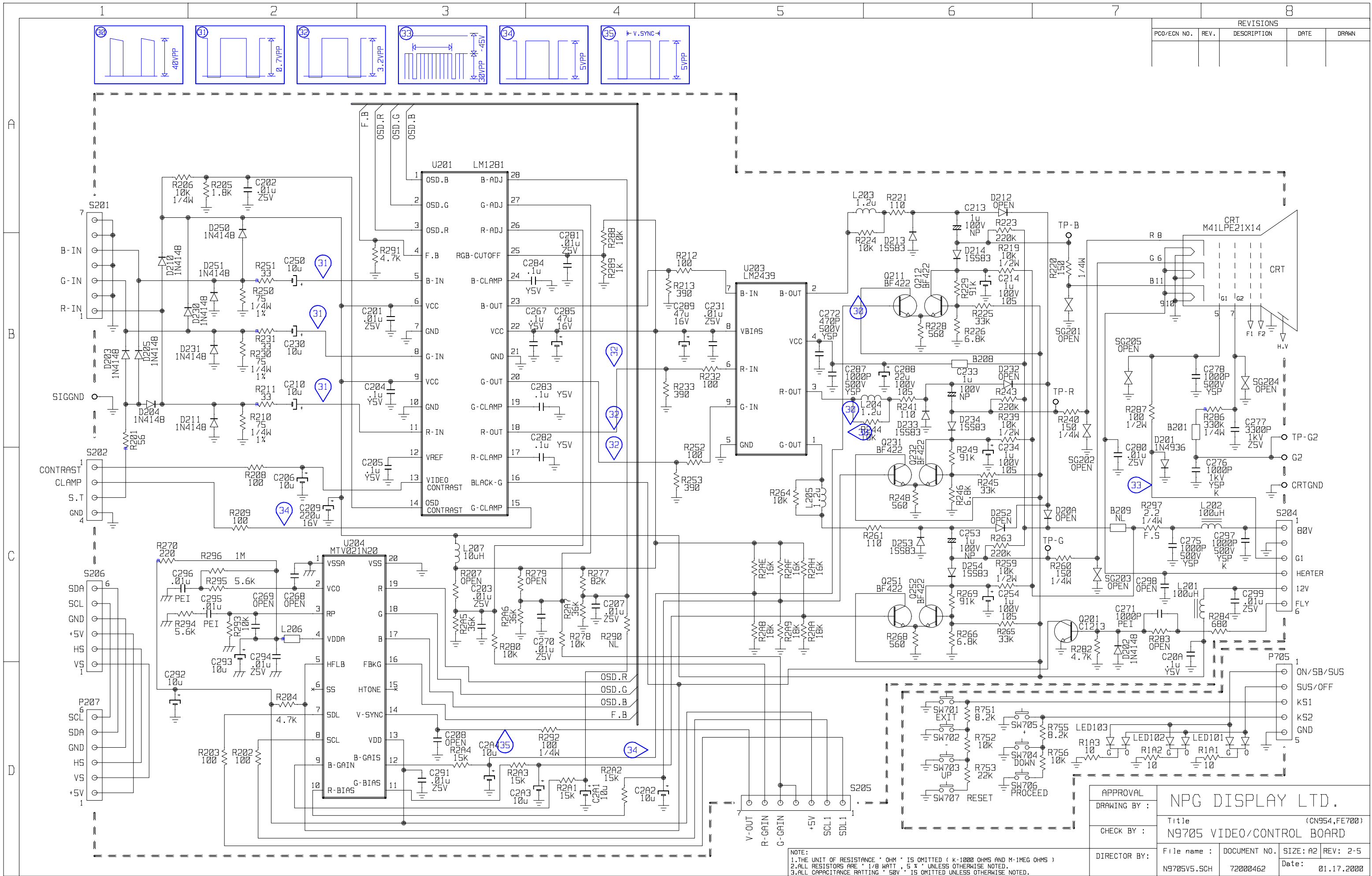




| REVISIONS | | | | |
|-------------|------|-------------|------|-------|
| ECO/PCN NO. | REV. | DESCRIPTION | DATE | DRAWN |
| | | | | |

| | | | | |
|---------------|--|------------------------------------|----------|------------|
| APPROVAL | | NPG DISPLAY LTD. | | |
| DRAWING BY : | | Mode1 N9705 MAIN SCH (CN954,FE702) | | |
| CHECK BY : | | File name: CN954MS.SCH | | |
| DIRECTOR BY : | | DOCUMENT NO. 72000452 | SIZE: A1 | REV: 2-5 |
| | | | Date: | 01.17.2000 |

NOTE: 1. THE UNIT OF RESISTANCE "OHM" IS OMITTED (K=1000 OHMS AND M=100 OHMS)
2. ALL RESISTORS ARE 1/8 WATT, 5% UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCE UNITTING "50V" IS OMITTED UNLESS OTHERWISE NOTED.



| | | | | |
|---------------|---------------------------|--------------|----------|------------|
| APPROVAL | NPG DISPLAY LTD. | | | |
| DRAWING BY : | Title (CN954,FE700) | | | |
| CHECK BY : | N9705 VIDEO/CONTROL BOARD | | | |
| DIRECTOR BY : | File name : | DOCUMENT NO. | SIZE: A2 | REV: 2-5 |
| | N9705V5.SCH | 72000462 | Date: | 01.17.2000 |